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## From a critical analysis of the concept to an environmental evaluation of its management arrangements

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## From a critical analysis of the concept to the environmental evaluation of its management arrangements


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# Contents

# Executive Summary

Sustainable Forest Management (SFM) has now become the dominant paradigm for managing forest areas. It is presented as being the only effective response, especially in tropical regions, to the urgent environmental issues blighting the end of the twentieth century. Few studies however have attempted to assess how successfully SFM, and the multiple arrangements that have been implemented in its name for over twenty years, have tackled these environmental challenges. Given today's state of tropical forests and the still alarming rate of deforestation and degradation, the need to look at this question is now even more justified.

This study examines the concept of SFM and its environmental dimension from an original analytical perspective using management science theory and a rigorous methodology based on a bibliometric analysis of over 2,500 references and some forty interviews with key SFM actors.

The SFM concept spread concurrently with that of the sustainable development in the early 1990s. Drawing on a legacy of former practices, it has progressively become institutionalised, from a regulatory viewpoint, in tropical countries mainly through the influence of international negotiations and bodies.

Alongside this regulatory dynamic, the SFM concept has gradually translated into diverse management arrangements that are still evolving. Here, we will show that these can be grouped into three main categories according to the primary goal targeted: *(i)* improve logging practices, *(ii)* develop carbon storage and *(iii)* increase local community participation. Although the SFM concept holds a diversity of meanings, the present study found that what these arrangements have a common is that they rely preponderantly on market-based regulation or contracting between stakeholders, the role of the State having gradually moved away from technical support to focus more on the legal frameworks needed to implement such arrangements.

At an environmental level, SFM has been the driving force behind some of the improvements brought to forest jurisdictions in tropical forest countries. However, diverse but often interrelated critiques have questioned the real capacity of this legal apparatus to deal with environmental issues effectively. The management arrangements presented in this study are the main operational SFM responses to the current environmental crisis affecting forests. On the ground, these arrangements tend to materialise in a hybrid form so as to integrate the three pillars of sustainable develop-

ment, but economic concerns (above all, the profitability of logging) continue to hold centre stage. The main rationale behind the implementation of SFM arrangements is normally to internalise externalities, the goal being to integrate environmental and social constraints into the forestry sector economy.

When it comes more specifically to biodiversity conservation, it became clear from our study that the SFM literature addresses this issue with considerable bias, and focuses primarily on the question of preserving forest cover and commercial species. As a result, biodiversity conservation still finds itself on the losing end of SFM, despite the fact that biodiversity problems are central to the issues affecting tropical forests ecosystems and the fact that these issues have been quite regularly foregrounded for over the last twenty years.

In addition to these findings, many publications concentrate on environmental assessments and the challenges of implementing them in regions with outstanding ecosystems, such as tropical forests. Yet, there has been little interest in applying these assessments to forestry activities as such, which buoys up the idea that the SFM management arrangements already in place have some kind of built-in "*sustainability*" and "*ecofriendliness*" that obviate the need for their environmental assessment. Moreover, the problem is very often reduced to a problem of forestry sector "*governance*" rather than one inherent to the proposed management arrangements themselves or to the environmental performance levels set for them. Very few measures are thus taken to verify that SFM is effective and efficient.

To conclude, there appears to be continuing tension between a tropical forest SFM approach mainly geared to logging activities and a conservation sector still perceived as a potential brake to the industry's growth. In this context, environmental stakes are given short shrift compared to economic stakes. The former could most likely be integrated much more effectively if strategic environmental assessments in the forestry sector were implemented, if knowledge on forestry and conservation were shared more effectively and a regular cross-sectoral dialogue maintained between the forestry sector and the other sectors with potentially adverse effects on forests (agriculture, mining, infrastructure). Certainly, it is unrealistic to think that the forestry sector alone is able to ensure environmentally effective SFM.

# Introduction

## Background and objective

"Sustainable" is the term that has been used to define tropical forest management for some twenty years now. This, at least, was the objective formally adopted by the international community at the 1992 Rio Summit, which emphasised that "forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations" (United Nations, 1992*b*, Principles/Elements 2(c)). Recognised since then as the dominant approach to ecosystem management, mainly in tropical countries, sustainable forest management (SFM) aims to reconcile economic, environmental and social issues and has since been mobilised at all spatial scales and by all the actors involved. At the present time, no project, programme or decision relating to forests and forest areas is elaborated without the inclusion of some reference to SFM.

However, over the past twenty years, forests, especially tropical ones, have come under intense pressure, resulting in a deforestation rate that the United Nations Food and Agriculture Organisation (FAO) have qualified as "*alarming*". From 2000 to 2010, the gross rate of loss through deforestation averages an annual 13 million hectares (ha) for a global forest area of around 4 billion ha (FAO, 2011). Concerning tropical forests, which cover some 2 billion ha, the FAO has evaluated the net deforestation rate at 5.4 million ha annually,[1] with Amazonia showing the highest net loss (around 3.6 million ha/yr between 2000 and 2010), followed by Southeast Asia (1 million ha/yr) and the Congo Basin (700,000 ha/yr; FAO & ITTO, 2011). This deforestation, coupled with the equally important phenomenon of tropical forest degradation, causes a huge loss of environmental goods and services (biodiversity, climate change mitigation and adaptation, water supply regulation, etc.), endangering the sustainability of these ecosystems and consequently of all the economic and social services associated with them in the short, medium and long term.

[1] The FAO only gives gross deforestation figures for the world's total forest area. Net deforestation figures given for the tropical basins represent "the sum of all negative changes due to deforestation and natural disasters and all positive changes due to afforestation and natural expansion of forests" (FAO, 2011, p.17). They thus mask the fact that gross deforestation figures are partly offset here by the areas of forest plantations, which have been on the rise in the three basins since 1990.

In light of this, several studies have pointed up the weakness of the SFM concept, its polysemic character, the excessive number of SFM approaches used, its unrealistic goal and the problems in implementing it, particularly in the South (Nasi & Frost, 2009). However, no in-depth analysis has yet established a complete diagnosis of the way this concept is operationalised and its actual contribution to dealing with environmental issues affecting tropical forests.

What is SFM? Where does it come from? How does the concept take shape on the ground, in the laws of the tropical countries concerned and in the arrangements and practices implemented? To what extent does it help to address the environmental challenges facing tropical forests? How is the concept assessed today? These are some of the questions that we seek to answer not only to afford a deeper understanding of the SFM concept and its implementation – particularly in tropical environments – but also to provide a strategic reading of its environmental scope given that it is extensively used in the development sector.

## Approach and methodology

This book is the result of management science research work conducted from January 2011 to April 2012 by the training and research group for the Gestion Environnementale des Écosystèmes et Forêts Tropicales (GEEFT – Environmental Management of Ecosystems and Tropical Forests) under AgroParisTech, together with the Economic and Social Research Department of the Agence Française de Développement (AFD).

Our research topic lies at the core of management sciences, as it encompasses the emergence of the SFM concept on the international agenda, the construction and dissemination of the SFM-supported standards underpinning the design of pilot systems at all scales (international, national or local) and an analysis that provides a clearer picture not only of the management arrangements that SFM helps to implement on the ground but also their effectiveness. This constitutes the main thrust of our research.

Although management sciences often have a prescriptive aim and propose technical models or management tools (mostly, to improve the economic and financial performance of organisations), this is not the aim pursued here. Our approach is in step with the critical management studies school of thought (Grey & Willmott, 2005; Golsorkhi *et al.,* 2009; Palpacuer *et al.,* 2010; Taskin & de Nanteuil, 2011), which questions first of all the nature and purpose of management processes and their

actual responsibilities, particularly their social and environmental dimensions (Palpacuer *et al.,* 2010).

We thus questioned the ultimate objectives attributed to the SFM concept and arrangements so as to render them more intelligible from both an ideological and theoretical as well as practical point of view. This meant clarifying their often-implicit management tenets, clearly expliciting their effects and, finally, re-questioning the choices made. Today, this type of approach is necessary since the ambiguity between the different practices adopted and implemented in the name of SFM and the rhetoric surrounding this concept make it difficult to decipher the systems of action now implemented.

Understanding the situation of tropical forest management today means tracing back the many trails that have led to its construction. To describe these trails, it was necessary to deconstruct current management situations using many heterogeneous materials. As Barbier (1998) points out, "we thus have to rely on printed material and its documentary analysis, on the one hand, and the actors' memory recall during sociological interviews, on the other hand" (Barbier, 1998, p.86).[2] The study is thus based on a rigorous and specific methodology that needs to be briefly outlined so that the origin and content of the analysis presented in this book can be fully understood.

## *Bibliographic survey and documentary analysis* *(cf. details in Appendix 3)*

A broad-based bibliographic survey was undertaken on the theme of SFM covering a little over 2,500 references including academic texts, grey literature and legal texts:

- the academic texts enabled us to take stock of the different discussions, standpoints and controversies found within the scientific community;
- the grey literature, mostly intended for policymakers and managers and sometimes the general public, enabled us to identify more precisely the management arrangements used, the actors' strategies, as well as the debates in the fora on SFM or public forest policies;
- the legal texts helped us to understand the dissemination of standards and the regulatory structures of SFM in tropical countries.

To supplement this systematic search, we added over 250 additional references that were useful for understanding the topic as a whole.

[2] All the quotes in this book taken from documents for which no published English translation exists have been translated by G. Gladstone (translator of the present book).

It was then possible to carry out several lexicometric content analyses, which allowed us to identify the trends, in each corpus, in the use of a number of lexical elements both within the entire content of the texts or in the bibliographic records (for the scientific texts). This allowed us to link these trends to the type of actors driving them, their countries of origin, the scientific journals publishing them and the publication dates. It should be remembered, however, that when an author uses vocabulary linked to a specific concept, this does not necessarily mean that he or she endorses it, otherwise, this may be a source of interpretation bias (Hautdidier, 2007). To avoid such bias, these lexicometric analyses constituted a first step followed up by an in-depth reading of the references collected.

### *Interviews with SFM actors* *(cf. Appendix 5)*

A series of semi-directive interviews gave a more precise picture of the practices implemented on the ground, allowing them to be compared with the associated legislation and the debates in the scientific and political spheres identified through our bibliographic analysis. Some forty interviews were conducted with key actors in tropical forest management and assessment. The interviewees were from different types of mainly French-speaking institutions (intergovernmental organisations, non-governmental organisations [NGOs], managers, industrialists, donors, engineering and audit consultants, researchers).

This book is divided into four parts corresponding to our lines of investigation. The first gives the reader the historical and technical background to the emergence and success of the SFM concept. The second and third parts aim to provide a concrete understanding of how the concept is operationalised in the tropical regions, focussing first of all on how it has been materialised and disseminated from a regulatory perspective (Part 2), and then on the various forms of management that it has led to in the countries concerned (Part 3). Based on these different elements, the fourth part undertakes a strategic analysis (Mermet *et al.,* 2005 and 2010) of how environmental concerns are effectively integrated into the management arrangements implemented under the cloak of SFM.

# 1. Sustainable management of tropical forests: The emergence and consecration of a dominant paradigm

Our documentary analysis shows that the term "sustainable forest management" (SFM) first appears in the scientific literature in 1990. Formally introduced into the public arena by the 1992 Rio Earth Summit, the term has since prevailed to the point of being systematically used at all levels, both locally and internationally, by a wide range of actors (Shvidenko *et al.,* 2005). As will be seen later, SFM involves a diversity of approaches and has gradually become "the" reference model for managing tropical forest ecosystems. Yet, the practices implemented under this designation date back further than the 1990s. They have in fact drawn much of their inspiration from different management models used in the past and should thus be seen as an inheritance descended from these earlier practices.

## 1.1. Forms of tropical forest management prior to the sustainable management concept

Colonial methods have strongly influenced the forest management models adopted in tropical countries at both the technical and management levels. Various "imported" principles have deeply impacted these models, as, for example, the principle of *"sustained yield"* or *"forest planning"*. Although criticised, these were widely implemented, and have since gradually given way to other rationales. All of these changes combined contributed to the emergence of SFM.

## 1.1.1. *Brief history*

### Colonial times (pre-1960s)

Tropical forests have always been harvested by local populations for different purposes (construction, energy, food, fodder, medicinal purposes, etc.). The commercial harvesting of tropical wood resources was a late development in Southern countries, mainly driven by large industrial companies under the aegis of colonisation, mostly in the Asian and African basins (Lanly, 1992; Williams, 2006; Ezzine de Blas & Ruiz Pérez, 2008). In Asia, and more specifically India, the first large-scale logging operations date back to the 1850s when the British Empire established massive teak plantations throughout the territory (Williams, 2006), a technique that was then extended to neighbouring countries under British rule. In Africa, forest management as an organised and planned economic activity first appears in the first half of the nineteenth century chiefly in West African countries (Ezzine de Blas & Ruiz Pérez, 2008); very few records, however, exist for the Central African countries (Williams, 2006).

In these Asian and African geographies, the principles of timber production were very much underpinned by an ideological corpus of knowledge of European origin (France and Germany) and by the influence that Western countries brought to bear in their colonies (Clément, 1997; Guillard, 1999). As a result, the management models used at the time for temperate ecosystems were also applied to tropical regions, the State being endowed with substantive responsibilities and decision-making powers (Peyron & Maheut, 1999).

During the first half of the twentieth century, colonial authorities concentrated on *(i)* building up a technical forestry corps (creation of colonial forestry services, development of education in forestry science and research laboratories); (*ii)* demarcating forest areas so as to ensure access to resources and their control by the State (Buttoud, 2001*b*); and *(iii)* developing and applying forestry technologies and logging practices (establishing the first plantations and taking natural regeneration into account).

The colonial powers' need for timber (for industrial growth, steam engines, large-scale warfare), the clearance of forestland for cash crop farming and the generally weak control over logging activities (even total absence of regulations) facilitated "mining-type" timber extraction processes that most often spared little concern for the renewal of the tropical forest resource. This extraction was long confined to coastal and river areas as these localities made it easier to supply colonial trade. In fact, the colonial forest management system was basically geared to ensuring the supply of cheap raw materials for the industries, markets and socio-economic development of the colonising nations (Guéneau, 2011).

Although the literature relating to the South American continent has to some extent been omitted from this analysis, it should be remembered that countries like Brazil were also massively involved in logging activities around the early 1850s in order to grow their national economies and find new land for their agricultural development (Williams, 2006).

### Post-independence (until the 1990s)

The decolonisation process that began during the 1950s (mainly in Africa and Asia), together with increasing demographic pressure, gave rise to an increasing demand for new farmland. Forest clearance gained pace and led to a significant loss of tropical forest cover as well as a fragmentation of the natural areas impacted (Guéneau, 2011). Added to this, the high demand for fuelwood sometimes led to the total disappearance of large swathes of forest in some of the most fragile regions (Lanly, 1992).

With the formation of these new States came the first national forest management institutions headed by local staff (water and forestry administrations, ministries in charge of agricultural and industrial affairs, etc.). For some countries, the world's tropical timber market, in full boom during the 1960s, opened up prospects of an economic growth that could partly rely on increased timber production (Wiersum, 1995). Logging activities intensified and extended beyond the coastal and river areas, capitalising on a series of technical innovations such as mechanised production methods and the development of wood processing facilities (Dupuy, 1996). This trend ultimately led to the large-scale industrialisation of the forestry sector (Buttoud, 2001b). It was during the second half of the twentieth century that the notion of timber production management really developed with the introduction of tropical silviculture methods (Lanly, 1992; Kammesheidt *et al.,* 2001a).

## 1.1.2. *The spread of the "sustainable yield" and "forestry planning" concepts*

The core concept of forestry – in other words, the development and optimisation of standing tree growth for the extraction of wood products – has its roots in silviculture (*cf.* Box 1). Over the course of history, it has spawned different practices, including "sustainable yield" forest management and the "forest planning" principle, both of which developed long before the 1990s.

## Box 1 *The origins of silviculture*

Silviculture involves the use of bioscience-based techniques to rationally control and guide forest development in order to conserve and improve the natural renewal capacity of forest resources (Schütz, 1990).

Setting aside biogeographical factors, the history and evolution of forests are closely tied to the development of agriculture. As early as Neolithic times, forests were used for hunting, then for extensive grazing and subsequently for the needs of sedentary populations (fuelwood, construction, fodder) (Schütz, 1990; Lanier *et al.,* 1994). In China, traces of silvicultural development date back to around 8,000 B.C., with vast forest clearing operations organised over a large parts of the territory. Ancient documents reveal that silviculture had earned so much recognition as a science that, when the Emperor Qin Shi Huang ordered the destruction of all outlawed books in 221 B.C., he made an exception for books on medicine, agriculture and silviculture (Jun-Yu & Shi Can, 1979).

Very few books or technical works on silviculture from before the eighteenth century have survived, leaving whole expanses of its history in the shadows; what does remain, however, are the empirical experiments (Lanier *et al.,* 1994).

The founding fathers of forestry as an academic science were of European origin. In 1764, the first silviculturalist, Henri Louis Duhamel du Monceau (1700–1782), published a book on forestry production techniques, which was to become a landmark work (Lanier *et al.,* 1994.). But it was in Prussia that modern scientific forestry originated thanks to the work of Georg Ludwig Hartig (1764–1837) and Heinrich Cotta (1763–1844). These men were behind the founding of the Prussian silviculture schools, which trained many foreign students (Russian, Swiss, Austrian, Spanish). Many of these were Frenchmen, such as Bernard Lorentz (1775–1865), who went on to found the Royal School of Forestry in Nancy in 1824. The term "silviculture" was first used by Cotta in his best-known work, *Anweisung zum Waldbau (Instruction on Forestry,* 1817). In the wake of these teachings, silviculture as a scientific discipline spread across Europe developing into various schools of thought. French silviculture began to flourish independently of the German thinking thanks to the works of Gustave Bagnéris (1825–1881) and Charles Broillard (1831–1910), as well as Adolphe Parade (1802–1864), and was adapted to deciduous seed forest environments. Swiss silviculture, on the other hand, turned to a more natural treatment of forests under the influence of Arnold Engler (1869–1923) (Schütz, 1990).

Today, silviculture can rightly be viewed as the discipline of applying ecological forestry sciences (Schütz, 1990).

*Source: the authors.*

## The sustainable yield rationale

The forestry doctrine of "sustainable yield" illustrates the concern to maintain, and if possible increase, the productive capacity of a given forest area in terms of wood or woody biomass, while at the same time ensuring the long-run supply of this resource (Wiersum, 1995).

So-called "sustainable yield" forest management supports the assumption that forest estates and timber resources can be sustainably harvested when a positive influence is brought to bear on natural renewal. This idea holds that managed forests can be "regenerated" either by direct intervention designed to increase their growth potential (plantations, improvements), or naturally, over a long enough period of time to enable further removal. Ecosystems are thus considered to be sufficiently resilient to the adverse impacts of conventional logging. These claims have been backed notably by observations of forests that have regenerated and survived in cases of periodic, and sometimes severe, natural disturbances (Spears, 1999). This approach thus argues that forest ecosystems can be managed like any other industrial enterprise and that nature can be modelled to fit the paradigm of industrialisation and commercialisation (Guéneau, 2011). Moreover, its advocates consider that this approach can ensure a suitable habitat for wildlife, with only minor consequences on aquatic environments (rivers, watersheds) (Spears, 1999).

Some temperate forests were and still are exploited in line with this concept (Japan, Scandinavia and Central Europe), which has also served as the key principle for forest management practices in tropical environments since the 1980s (Wiersum, 1995; Wang, 2004; Luckert & Williamson, 2005). The introduction of sustainable yield systems for tropical forests is also thought to have substantially improved the harvesting practices implemented in these regions, which had until then been of a purely "mining" type.

Nonetheless, a great deal of evidence has built up from tropical regions that refutes this alleged improvement (Nasi & Frost, 2009). Implementing the logic of sustainable yield in tropical ecosystems has in fact been increasingly difficult due to *(i)* the inherent complexity of ecosystems; *(ii)* the longer time needed to renew the timber resource; *(iii)* the use of poorly adapted harvesting techniques; *(iv)* the pressure exerted by the increase of commercial plantations; *(v)* the impact of slash-and-burn farming and *(vi)* demographic pressures (Spears, 1999). Many of its critics have also underlined the negative impacts of timber harvesting on the other components of these ecosystems (FAO, 2001*b*; Wang, 2004). Although designed to maintain long-term production, sustainable yield methods, which focus solely on timber resources, have led to situations in which all other potentially valuable forest products in need

of greater protection have been neglected (Luckert & Williamson, 2005). The sustainable yield rationale has thus given rise to harvesting practices for commercial and industrial purposes that fail to take overall account of environmental and social aspects (Eba'a Atyi, 2001).

The raft of failed experiments in tropical environments and the onslaught of scientific criticism in the late 1980s gradually undermined convictions about the validity of the sustainable yield forestry paradigm (Lanly, 1992; Wiersum, 1995; Eba'a Atyi, 2001; Wang, 2004; Nasi & Frost, 2009). Thereafter, the notion of sustainable production through multiple-use forestry (MUF) helped pave the way for the emergence of the sustainable forest management (SFM) concept.

## The place of the "French School" – the concept of forestry planning

The concept of "forestry planning" also grew out of the search for sustainable forest production, but it is based on a planning process aimed at "regulating felling" (Guillard, 1999). The idea was to "imitate nature, hasten its work", to use a popular expression from the world of forestry (Lanly, 1999). This concept seems to have appeared in France under the Ancien Régime (Boutefeu, 2005). With Colbert's 1669 Forest Ordinance, which regulated timber harvesting in French forests until the Revolution, forest planning gradually became a reference. The Water and Forest Administration, newly created in the wake of 1789, actively promoted its development and dissemination up to the end of the twentieth century, in Europe and *de facto* for temperate forests. Its operational framework was bolstered by a raft of techniques, a body of scientific forestry knowledge and the logic of economic development, and gradually fleshed out this doctrine, which was above all based on a planned approach to timber felling.

Towards the end of the twentieth century, the French, German and then English forestry schools extended its application to other forest ecosystems including those found in dry regions, montane forests and boreal and tropical regions. This spread was facilitated by the creation of corps of technicians and engineers whose mission was to preserve these practices and ways of thinking, not just at home but also in the colonies, where the questions of how to manage logging were taking on greater importance. Thus, throughout the twentieth century, the forest planning rationale quite naturally dovetailed with forest management processes in Africa and Asia under French and Anglo-Saxon influence.

The expansion of logged forest areas during the twentieth century and the lack of scientific knowledge on the specific characteristics of tropical ecosystems fed the illusion of an immensely rich and inexhaustible resource (Guillard, 1999). However,

the concept of "French-style" forest planning came up against different limits when implemented in tropical regions (particularly in Africa) and this gradually led to the notion of sustainable forest management, which will be dealt with in Part 2. Yet, we should point out here that forest management models based on sustainable yield and forest planning have not been abandoned and are still in currency, sometimes on a large scale, in the tropical basins (Peyron & Maheut, 1999; Guéneau, 2011). However, other rationales have slowly emerged alongside these dominant models.

### 1.1.3. *Other rationales?*

In the late 1980s, various critical movements were behind the emergence of management models aiming to go beyond the conventional exploitation of forests, as for example, forest certification and participatory forest management (Nasi & Frost, 2009).

#### Civil society and forestry sector initiatives: ideas evolve towards ecocertification

The first ecocertification initiatives appeared before the term "SFM" had gained full recognition, mostly in the context of tropical timber boycotts and the pre-Rio talks. In the mid-1980s, for instance, the NGO Friends of the Earth published the *Good Wood Guide,* which classified companies according to their degree of responsibility vis-à-vis logging practices (Guéneau, 2011). This sparked various discussions that culminated in the pioneering SmartWood certification programme launched in 1990 by the NGO Rainforest Alliance, which was then seeking to develop a certification scheme to identify wood products sourced from well-managed forests (Tsayem Demaze, 2008).

#### Towards participatory forest management

Today, local community participation seems ineluctable when the topic of forest management is addressed. Smouts (2001), however, points out that it took some time for these concerns to gain recognition. They had been plagued by a deep ideological rivalry between the "conservationists" on one side, who criticised the adverse impact these communities could have on nature, advocating a forest conservation approach that excluded all human activity (Devall & Sessions, 1985) and, on the other side, there were those arguing that the use of forests by the local forest-dependent communities should be taken into account. Ironically enough, the logging companies, which saw local communities as an obstacle to their logging activities, held the same discourse on this issue as the "conservationists".

It was the thinking of the 1970s and the ecodevelopment proposed by Sachs (1980) that nonetheless brought these considerations to the fore. Most support came from the various NGOs who were beginning to defend the place of indigenous and local communities and attracting a great deal of media attention (Smouts, 2001). A notable example of this is the flurry of media reports in 1989 around the international campaign led by Raoni Metuktire, the chief of the Koyapo people, in defence of the Amazonian tribes and the fight against tropical deforestation. Given the urgent need to address tropical deforestation, these NGOs engaged in a strategy of resistance and denunciation through actions that were still far-removed from any form of cooperation with States on forest management (Manser, 1996). Their actions aimed above all to raise public awareness on the question of indigenous peoples and to support the setting up of several forest projects intended to benefit local communities.

These movements, together with the growth of a real epistemic community devoted to analysing local forest management practices, greatly furthered the recognition of community participation as a management system in its own right.

Countering the thesis of the "tragedy of the commons" (Hardin, 1968), which holds that a non-appropriated resource is inevitably badly managed, the ideas defended by the school of the Commons (Ostrom, 1990) proposed that local populations disempowered of their forest rights should be taken into account and forest governance decentralised. The idea is to encourage local communities to participate in their own development in the spaces that they are used to managing.

The fact that international bodies endorsed a school of thought promoting community participation and management marked a clean break with the conventional highly centralised systems that tended to promote the State's role in managing renewable resources.

It could be conjectured that, in the late 1980s, the dismantling of state bodies under the structural adjustments prescribed by the International Monetary Fund (IMF) and the World Bank, along with the implementation of decentralisation policies in Southern countries, subsequently served to reaffirm the "participatory model" (Leroy, 2005). In the 1990s, participatory projects were mainstreamed with backing from major donors, who also garnered support from many NGOs. At the end of the twentieth century, this growing support for participatory approaches, now the main *leitmotiv* for donors and large development agencies (Leroy, 2008), devoted all its attention to forest issues on the international agenda (*cf.* below).

## 1.2. The advent of sustainable development and its application to forest management

SFM evolved concurrently with the broader principle of sustainable development. It would be useful therefore to trace the emergence of this concept before going on to see how it has been specifically applied to forests.

### 1.2.1. *Sustainable development, the emergence of a paradigm*

The dialectical relationship between the development of human activities and environmental preservation has been the subject of deep and age-old debate, as shown by the metaphysical conceptions of nature in Greek and Roman philosophy, which tended to place economics and ecology at opposite poles and thus create an epistemological dichotomy between the two disciplines (Faucheux & Noël, 1999). The concept of sustainable development disseminated at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio (also known as the Earth Summit) has tried to reconcile these two spheres.

#### Multilateral environmental agreements on sustainable development

Yet, environmental problems had already found their way onto the international agenda long before the 1992 UNCED. As Le Prestre (1997) underlines, it was after the Second World War that the setting up of "regimes"[3] became the predominant form of cooperation between nations to resolve shared environmental problems. These regimes take the form of Multilateral Environmental Agreements (MEAs) relating to trade in endangered species, fisheries, waste disposal at sea, the exploitation of the Antarctic, the ozone layer, etc.

Yet, it was the media coverage of large-scale ecological disasters followed by the many cries of alarm from various researchers, such as the *Limits of Growth* report for the Club of Rome (Meadows e*t al.,* 1972), in response to borderless environmental issues (the hole in the ozone layer, acid rain) that truly laid the first building blocks for an edifice to institutionalise the management of these issues. This meant calling on all States and showing the will to tackle these new threats jointly. As a result, the first United Nations Conference on the Human Environment (United Nations, 1972)

[3] "A regime is generally understood as a set of interrelated norms, rules and procedures that structure the behaviour and relationships of international actors so as to reduce the uncertainties that they face and facilitate the pursuit of a common interest in a given issue area" (Le Prestre, 2002, p.88). Levy *et al.* (1993) differentiate between three types of regimes: (1) mainly regulatory regimes that focus on setting forth and applying rules of action, (2) management regimes that lay emphasis on the procedures to be followed so as to reach collective choices and (3) programme-based regimes that aim to encourage common projects.

was convened in Stockholm. During the proceedings, it was proposed that specialised institutions be set up both at the international level (United Nations Environment Programme [UNEP], the counterpart of the United Nations Development Programme [UNDP]) and the national level (creation of ministries of the Environment and environmental planning underpinned by legal instruments). The Stockholm conference was also an opportunity to re-examine the environment-development nexus: the concept of eco-development[4] was introduced by Maurice Strong (Sachs, 1980) as offering a more endogenous economic growth model compatible with social equity and ecological caution and based on the satisfaction of human needs rather than on uncontrolled increase in supply.

However, in the absence of concrete action following the Stockholm Conference and given the world's worsening economic and ecological situation (Godard, 1994), the United Nations General Assembly decided to mandate a World Commission on Environment and Development (WCED) in 1983. Its conclusions were formalised in 1987 by its president, Gro Harlem Brundtland, in the now famous report, *Our Common Future* (WCED, 1987). The report enshrines the concept of sustainable development, which had been proposed several years earlier by the International Union for Conservation Nature (IUCN) in its report, *World Conservation Strategy. Living Resource Conservation for Sustainable Development* (IUCN, 1980). The French translation for this term was first "développement soutenable" later to become *"développement durable"*. Yet it did not become popularised or receive extensive media coverage until the 1992 UNCED in Rio, which was attended by 178 countries and 110 heads of State and Government. The Rio Summit unanimously adopted a founding text of twenty-seven principles – the Rio Declaration on Environment and Development – which sets out some of the contours of the notion of sustainable development.

## The rationale behind sustainable development

The commonly accepted definition of sustainable development is that proposed by the Brundtland report, which state that it "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p.43). Its guiding principle is to ensure a "virtuous" balance between three fundamental pillars: economic, social and environmental.

[4] "The increasingly dramatic conflict between growth and the state of nature can only be resolved by stopping growth. The challenge is to find ways and uses for growth that make social progress and sound management of resources and environments compatible" (Sachs, 1980, p.12). (Translator's translation).

At the 1992 Rio Summit, developing countries nonetheless strongly insisted that economic development remain one of the preconditions for headway on the ecological front (Le Prestre, 2005). A consensus was nonetheless reached and is clearly set out in the Rio Declaration's principles 3 and 4: "Principle 3 – The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations. Principle 4 – In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it".

With the advent of sustainable development, environmental matters thus benefitted from a more consensual political thrust that dovetailed the interests of national and international structures involving States and international government organisations (IGOs), civil society (through NGOs) and actors from various scientific and technical communities (economic, sociological, ecological, etc.).

### 1.2.2. *The place of tropical forests in sustainable development issues*

Forests, and more specifically tropical forests, are at the heart of sustainable development issues due to their importance not only in ecological terms (conserving plant and animal biodiversity, regulating water resources, carbon storage, etc.) and social terms (improving the living conditions of forest-dependent communities, recognition of traditional knowledge, preserving ecosystems for future generations, etc.), but also in economic terms (production and removal of wood resources, income generation for local communities, etc.). Given the signals of alarm surrounding the state of forests in the late 1980s, these issues were propelled to the forefront of the sustainable development debate.

#### The state of forests at the end of the 1980s: the alarm is sounded

The state of world's forests and the different pressures placed on them are now well documented. We know that historically tropical forests have been exposed to various disturbances that are mainly anthropogenic in origin, such as industrial timber extraction, the development of agriculture, the harvesting of forest products by local populations, clearance and tree felling (Diamond, 2005; Williams, 2006), all of which have accelerated deforestation (*cf.* Table 1).

Table 1 *Net changes in forest cover and annual deforestation rate in temperate and tropical forests between 1700 and 1995 (millions of ha)*

| Date | Tropical | Temperate | Total | Rate/year |
|---|---|---|---|---|
| 1700-1849 | 109 | 180 | -289 | 1.94 |
| 1850-1919 | 70 | 135 | -205 | 2.97 |
| 1920-1949 | 235 | 99 | -334 | 11.52 |
| 1950-1979 | 318 | 18 | -336 | 11.57 |
| 1980-1995 | 220 | 6 | -226 | 15.20 |

*Source: based on Richards (1990), re-used by Williams (2006).*

However, it was not until the late 1980s that the scientific community as a whole, as well as public opinion, recognised the extent of global deforestation (Smouts, 2001). Yet, this was not for want of warning signs.

In the early twentieth century, the Zon and Sparhawk (1923) had made one of the first assessments of the world's forests and had already speculated that these would undergo future decline. During the second half of the twentieth century, other researchers had also tried to alert public opinion to the state of tropical deforestation and its consequences. In a book published in 1952, the botanist P.W. Richards predicted that tropical forests would disappear over the course of the twenty-first century. In 1973, the geographer W.M. Denevan came to the same conclusion as Richards and provided deforestation figures for the Amazon Basin. However, this research remained unknown to the general public. In the 1970s climate of growth in developing countries, the question of forest ecosystem destruction was only raised insofar as it hindered economic development. The issue was still far from being addressed on a planetary scale (Smouts, 2001). At the time, international debate on the environment was as yet in its infancy.

The FAO, for its part, began work on assessing global forest resources as early as 1948 (FAO, 1948), but the first estimates of the extent of deforestation on a planetary scale date to 1976 (Sommer, 1976); previous estimates had been limited to assessing harvesting by commercial logging activities (FAO, 1955, 1960 and 1966). At this time, overall annual deforestation (in tropical and non-tropical regions) was estimated to average 11 to 15 million ha for the world as a whole. Apart from the many contro-

versies triggered by Sommer's 1976 paper (Grainger, 1993),[5] his assessment gave the general public a first indication of the extent of tropical ecosystem degradation, reinforcing the idea that it was urgent to act swiftly and jointly to deal with the problem. The figure of 15 million ha deforested each year and its multiple variants (30 ha per minute, the equivalent of one football pitch per second, etc.) soon became catchphrases taken up by the media to convey the extent of damage and legitimise the environmental actions proposed by many NGOs (Smouts, 2001).

The FAO continued its investigations into the extent of deforestation by producing a series of five-yearly reports assessing global forest resources. The 1980 assessment (FAO & UNEP, 1982) communicated more precise figures. Based for the first time on a technical definition of forests integrating measurable parameters,[6] the study published the official figures of 11.3 million ha deforested annually, of which 7.5 million concerned dense humid forests.

It was therefore during the 1980s that the question of tropical deforestation took on an international dimension. It was extensively covered by the campaign to boycott some tropical timber, which became widespread in Northern countries. Logging operations and logging companies identified as responsible for deforestation and the destruction of local populations' living environment came under pressure from many NGOs,[7] consumer associations and local authorities to stop the industrial-scale exploitation of forests. In some European countries (Germany, Austria, Netherlands, United Kingdom, Switzerland), measures were taken after 1988 to limit or even ban the import of timber from tropical rainforests (Buttoud, 2001*b*). The campaign's impact, which was more psychological than legal, helped to raise public awareness of environmental issues touching on forest ecosystems and environment-unfriendly harvesting practices.

In the early 1990s, consternation reached a climax following the publication of the FAO's 1990 assessment of global forest resources (FAO, 1993). Using new satellite imaging techniques, the 1990 assessment added robustness to the earlier attempts at quantification, giving a sound scientific basis that was to serve as a baseline for subsequent years. This study successfully corrected the shortcomings of the 1980

[5] The main controversies involve the quantification and calculation methods used. In the second part of this book, we show that, today, it is still difficult to produce reliable data on global forest cover and deforestation rates.

[6] The FAO's definition of forests has greatly changed over time. In Part 4, we present the state of knowledge on this subject.

[7] Mainly Anglo-Saxon NGOs: Greenpeace, Rainforest Alliance and the World Wildlife Fund (WWF).

report, which had come under criticism. Since it compared the updated 1990 figures to those for 1980, the study also provided a precise estimate of forest cover loss at regional level for different land-cover classes during the 1980–1990 period (closed forest, open forest, long fallow, fragmented forest, scrub, short fallow, other land cover, water and plantations). The FAO then officially gave the figure of 15.4 million ha of annual deforestation between 1980 and 1990, along with a re-assessment of the 1980 estimates (*cf.* Table 2).[8]

**Table 2** *Comparison between the 1980 and 1990 assessments of tropical forest resources (millions of ha)*

| Estimates | 1980 FAO Assessment | 1990 FAO Assessment |
|---|---|---|
| Tropical forest area in 1980 | 1,935 | 1,910 |
| Global annual rate of deforestation | | |
| 1981-1985 | 11.3 | - |
| 1981-1990 | - | 15.4 |

*Source: based on FAO (1993).*

Although experts disagree on the accuracy of deforestation figures, the official conclusions at the beginning of the 1990s remain unaltered: forests are subject to various kinds of pressure that are constantly increasing with time; there is galloping deforestation in the developing countries and nothing seems to be able to put a stop to this. It was against this backdrop that the Rio Summit was held in 1992.

## The non-binding texts adopted at the Rio Summit: the Statement of Forest Principles and Agenda 21

At the 1990 G7 Summit in Houston came the proposal that a legally binding agreement addressing the forest issue at international level should be formulated at the Rio UNCED (Guéneau, 2006). The FAO had, in fact, already begun a consultation process in view of creating this type of international legal instrument for SFM (United Nations, 1992*b*). Yet, although the Rio Summit certainly offered an opportunity to address forest issues at an international level (Dembner, 1995; FAO, 1995), the positions taken

[8] It should be pointed out here that the calculation methods changed considerably between 1980 and 1990, but have done so even more since 1990 (as will be seen in Part 4). These figures, which were used at the time, are thus cited for the reader's information.

by the different countries diverged too widely for a legally binding agreement to come to fruition. During these talks, the industrialised countries were basically in favour of a text banning the felling of tropical forests, whereas the developing countries, then led by Malaysia, insisted that the text also needed to include temperate and boreal forests, given that these had equally suffered from deforestation and degradation (United Nations, 1992c). The stakes of forest conservation, mainly backed by the industrial countries, ran counter to the wishes voiced by the developing countries. For them, their forests and forest areas constituted above all natural and land resources to drive their economic development. The objective of reaching a global framework convention on forests thus failed to materialise.

Instead, the different parties present agreed on a series of forest principles included under a "Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and the Sustainable Development of All Types of Forests". This Statement is consistent with the pursuit of sustainable development, as shown by the following excerpt from its preamble: "Forestry issues and opportunities should be examined in a holistic and balanced manner within the overall context of environment and development, taking into consideration the multiple functions and uses of forests, including traditional uses, and the likely economic and social stress when these uses are constrained or restricted, as well as the potential for development that sustainable forest management can offer" (United Nations, 1992*b*).

At the Rio Summit, the States also committed to a global programme for action: Agenda 21. This sets out the strategies and formulates recommendations for governments, donors, NGOs and private sector organisations. The purpose was to help them acquire the means, mainly financial, required to implement sustainable development policies in the areas of *(i)* economic development; *(ii)* the conservation and management of resources for development; *(iii)* stakeholder participation; and *(iv)* cross-cutting means of implementation to redirect development onto a more sustainable path (United Nations, 1992*a*, Preamble [c]). Concerning forests, Chapter 11 provides several recommendations including recognition of the knowledge of local populations: "Carrying out surveys and research on local/indigenous knowledge of trees and forests and their uses to improve the planning and implementation of sustainable forest management", as well as the implementation of national forest action programmes: "To prepare and implement, as appropriate, national forestry action programmes and/or plans for the management, conservation and sustainable development of forests" (United Nations, 1992*a*, 11.14 [d] and 11.12 [c]).

Signed by all the stakeholders, these diverse non-binding texts propose a series of principles and courses of action, often referring to or complementing other international commitments and national regulations. Even though the fact that they have little legal force weakens their real capacity to promote a change in practices, these texts have nonetheless helped to give substance to the SFM concept.

## SFM and the plurality of its definitions

The English term "sustainable forest management" has given rise to various French translations. For instance, the translation found in Chapter 11 of Agenda 21 is *"aménagement rationnel"* (literally "rational planning"). However, the French translation of the word "sustainable" as applied to forest management has followed the same path as the translation of "sustainable" as applied to "development": the initial literal translation in French was *"soutenable"* but this was subsequently changed to *"durable"*. The term "management" has also been translated by two French terms: *"aménagement"* (development, planning) or *"gestion"* (management, administration). Even though the SFM concept now seems to be internationally accepted and refers to practices that go far beyond the notion of *"aménagement durable des forêts"* ("sustainable forest planning"), the two terms are sometimes employed indifferently in French. The use of the word *"aménagement"* seems to stem above all from the planning-oriented tradition of French forestry practices, which consider forest planning to be the most relevant management concept applicable to a specific forest. The use of both French terms, *"gestion durable des forêts"* (GDF; in English, sustainable forest management or SFM) and *"aménagement durable des forêts"* (ADF; in English, sustainable forest planning or SFP) is thus not infrequent, although for foresters they are not usually regarded as being synonymous. The agreed use of a single term in English not only makes for fewer misunderstandings but it also greatly facilitates bibliographic analysis.

Over and above these disparities, which lead to a first level of confusion (as does the concept of sustainable development), the notion of SFM is imprecise (Smouts, 2001). It is thus hardly surprising to find a range of definitions which each highlight different characteristics, as the three definitions below go to show.

1. The International Tropical Timber Organization (ITTO) defines SFM as "the process of managing permanent forest land to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment" (ITTO, 1992*b*, p.2). As Smouts

points out (Smouts, 2001), this definition appears to be highly industry-oriented and utilitarian, and thus in line with a rationale of sustainable yields and the sustainability of logging.

2. The Statement of Principles for Forest Management stipulates: "Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. These needs are for forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products. Appropriate measures should be taken to protect forests against harmful effects of pollution, including air-borne pollution, fires, pests and diseases, in order to maintain their full multiple value" [9] (United Nations, 1992*b*, Principles/Elements 2 [b]). This definition is totally in line with the spirit of Rio, as Smouts also points out (Smouts, 2001), as it incorporates a list of the human needs to be satisfied in the present and future, a catalogue of forest resources, threats to forests and, finally, vague recommendations designed to enable States to protect the integrity and diversity of their forests.

3. The definition most often used internationally was coined in 1993 within the framework of a consultation process on European forests involving thirty-seven countries. The Council of Europe used this definition for its Regulation on the action of the European Union (EU) in the domain of tropical forests (Smouts, 2001). It is worded: "'sustainable management' means the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems" (Ministerial Conference on the Protection of Forests in Europe, 1993, p.1). [10] This definition proposes a relatively dynamic vision integrating both short- and long-term concerns, recognises that there are different spatial scales for relevant forest functions and relies on good forest stewardship to reconcile use and sustainability (Smouts, 2001).

[9] French translation of this paragraph was inserted into the French national plan for the implementation of the Statement of Forest Principles (French Ministry of Agriculture and Fisheries, 1995).

[10] Resolution H1, Part D. This definition was taken up by the French Ministry of Agriculture, among others.

The plurality of these definitions is reflected in the fact that some vastly differing practices have been associated with the SFM paradigm, as we shall now see in our exploration of how the SFM concept is operationalized. We will first look at the legal and institutional aspect that has accompanied (and still does) the institutionalisation of SFM in tropical countries (Part 2), then go on to present the way in which these have materialised in the different management arrangements promoted since the early 1990s (Part 3).).

# 2. Sustainable forest management and its regulatory institutionalisation

For tropical countries, the expansion of the SFM concept following the 1992 Rio Summit resulted in a flurry of legislation. The forest issue was circumscribed on all sides by international and national legal instruments, creating a general climate from which it can no longer be extricated (Smouts, 2001).

This second part first traces the evolution of the international debate on forests, which actively influenced pro-SFM regulation in the public policies of tropical countries. It then describes the processes through which these legal texts and their contents were adopted, before concluding on the challenges of enforcing this legislation.

## 2.1. The influence of international negotiations on national forest policies

International arenas have played a key role in the adoption and/or revision of national forest policies in tropical countries. To understand how these policies have changed, we need to examine what has happened at an international level through the promotion of successive Tropical Forests Action Programmes (TFAP) and National Forest Programmes (NFP) and the setting up of the Intergovernmental Panel on Forests (IPF) and then the United Nations Forum on Forests (UNFF) so as to gain an overall picture of how forests have been integrated into the various international environmental agreements.

### 2.1.1. *The failure of the TFAP*

The destruction and degradation of tropical ecosystems first raised public alarm in the 1980s. Although international funding to reduce these phenomena (FAO, 1985) was in fact shrinking, the need for action was recognised at the sixth session of the FAO Committee on Forest Development in the Tropics [11] in 1983. Here, it was

[11] A United Nations statutory body.

proposed that the FAO Committee on Forestry (COFO), together with the World Bank, the World Research Institute (WRI) and the UNDP, prepare and expedite a series of programmes and actions at the regional and global levels to address these issues. As a result, the TFAP[12] was set up in 1985 in the wake of the Ninth World Forestry Congress in Mexico. The Plan was formally launched two years later in 1987 at a meeting co-sponsored by the FAO in Bellagio, bringing together donors, IGOs, NGOs and government representatives in order to establish a strategy for future action on tropical forests. The attending member States adopted the TFAP, which was to be fine-tuned at national level in the form of a National Forestry Action Plan (NFAP). For all the then participants, the TFAP provided a strategic action framework geared to improving development of their national forestry sector as well as meeting the needs of local communities (Smouts, 2001). The lynchpin of this approach was the coordination between donors and States (FAO, 1992) and five priority action areas were identified: forestry in land use, forest-based industrial development, fuelwood and energy, conservation of tropical forest ecosystems and institutional development (FAO, 1992).

The reform of national policies on tropical forests is a key component of this programme. Even though many countries already had policies (sometimes very old) in place, these lacked coherence[13] and made inadequate provision for environmental concerns. The TFAP thus became a landmark instrument for national forest development strategies (Smouts, 2001). The opportunities for forestry sector development offered by the TFAP reference framework encouraged the flow of multilateral and bilateral aid to tropical countries. As the then president of the World Bank Barber B. Conable (1988) wrote: "We hope this plan will stimulate financial commitments from developing and industrial country leaders, development assistance agencies and private sector for a greatly expanded and coordinated global effort to sustain tropical forest resources."[14]

The TFAP was adapted into NFAPs in over ninety countries, most of which were in the three tropical basins (FAO, 1992). However, the speed at which the NFAPs were implemented varied depending on the national settings. In 1994, thirty-nine countries were at the planning stage, nineteen had a completed action plan and thirty-four were at an advanced stage of implementation (FAO, 1994*b*).

[12] The Tropical Forest Action Plan was renamed the Tropical Forest Action Programme in 1991.
[13] Jurisdictions sometimes had only a regulatory component addressing forest questions with no legal component.
[14] FAO translation.

Although the process aimed to tackle what were then identified as the drivers of deforestation – mainly slash-and-burn agriculture and illegal forest clearance – it broke down in the early 1990s following numerous criticisms from ONGs (Smouts, 2001). The first evaluations of the TFAP by NGOs had revealed different failings in the process. The main criticisms decried above all the replication of a technocratic forestry system which, instead of dealing with the shortcomings of national forestry sectors, institutionalised and bolstered a productivist and industrial rationale for forest management (Singer, 2003; Guéneau, 2011). The absence of local community participation was also singled out not only by the NGOs but also by the founding organisations (FAO, 1994*b*). The NGOs, with the donors behind them, then decided to withdraw their support for the FAO, which they designated as being solely responsible. Although the TFAP had fallen short of its goal of bringing structural change to national forest policies, it nonetheless managed to shed light on what reforms needed to be implemented to tackle deforestation (Like & Fletcher, 1992).

### 2.1.2. *From the TFAP to NFPs*

Faced with the failure of the TFAP and the new challenges brought to the table at Rio (such as recognition of environmental and social issues), the international community continued its negotiation process on forest issues, a process that was to materialise in 1995 in the form of the new Intergovernmental Group on Forests (IGF). This was set up by the UNCED to coordinate proposals for action in view of implementing the forest principles explicitly laid out under Agenda 21 (United Nations, 1992a). Headquartered in New York, the IGF comprised members from the UNCED, UN member States, non-member States, specialised institutions, IGOs and ONGs (UNCED, 1995). Operating under a two-year mandate, it focussed on twelve components [15] that called for action programmes, all of which were to be covered by policy recommendations at the fifth session of the United Nations Commission for Sustainable Development (UNCSD) [16] planned for 1997 (UNFF, 2002). No fewer than 150 proposals for action were made during its mandate. Once the mandate had

[15] 1) National forest and land-use plans and programmes; 2) underlying causes of deforestation and forest degradation; 3) traditional forest-related knowledge; 4) fragile ecosystems affected by desertification and the impact of atmospheric pollution; 5) needs and requirements of countries with low forest cover; 6) international cooperation and technology transfer; 7) valuation of forest benefits (products and services); 8) forest assessments; 9) criteria and indicators; 10) trade and environment; 11) international organisations, and multilateral institutions and instruments; and 12) legal mechanisms.

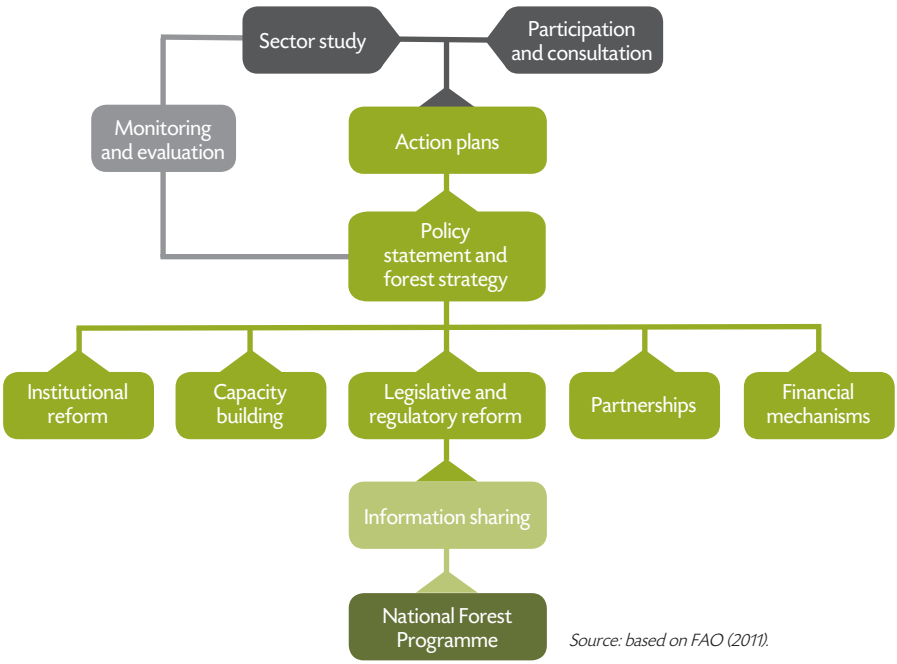
[16] The UNCSD was set up by the United Nations General Assembly at the 1992 UNCED in Rio. It is in charge of monitoring the actions implemented under the Rio Declaration and Agenda 21 at both international and national levels. It comprises 53 member countries and meets annually to prepare and monitor multi-year work programmes on topics that vary in line with the voted agenda.

terminated, and following one of IGF's proposals, the UNCED created the Intergovernmental Forum on Forests (IFF) in 1997, which replaced the IGF. This had the same membership as IGF and kept its New York headquarters (UNCED, 1997), IFF's mandate was to facilitate the implementation of IGF's proposals for action, and to finalise these (all of which had to be completed before its mandate expired in 2000). All in all, 270 proposals were formulated under these two international bodies.

Among the broad range of issues addressed by IGF, components 1 and 12 guided the actors involved to focus more specifically on national forest policies ( Söderlund & Pottinger, 2001). The ensuing NFPs [17] symbolised a new departure for international intervention on forests matters. The purpose was to design the NFPs so as to encourage information sharing and the participation of all actors who depended on forests (*cf.* Figure 1), contrary to the TFAP's heavily criticised top-down approach (Singer, 2003).

[17] It should be remembered that these plans had been recommended under Chapter 11 of Agenda 21 defined in 1992: "... prepare and implement, as appropriate, national forestry action programmes and/or plans for the management, conservation and sustainable development of forests" (United Nations, 1992a, 11.12 [b]).

Figure 1 *General framework for forest policy revisions under the NFPs*




*Source: based on FAO (2011).*

The NFPs are designed to take account of the sustainable development perspective (FAO, 1996) by providing an overall planning framework for developing the forestry sector in tropical countries. In compliance with the 1992 Forest Principles (United Nations, 1992b), these frameworks were extended to all types of forest, and thus automatically to all temperate countries, with their preparation and implementation being grounded on the twelve structuring principles [18] (FAO, 1996). These NFPs became the chief instrument for revising forest policies and they continue to be widely successful today, as different countries are still preparing them. Since the late 1990s, many institutions and donors have been actively supporting the formulation and implementation of NFPs in tropical countries through initiatives such as the World Bank's Program on Forests (PROFOR) (Ivers, 2006) and the National Forest Programme Facility hosted by the FAO (Blaser, 2010).

[18] *(i)* Sustainable forest development; *(ii)* sovereignty and national leadership of the process; *(iii)* partnership; *(iv)* a participatory approach; *(v)* a holistic and intersectoral approach; *(vi)* a long-term iterative process; (vii) capacity building; *(viii)* policy and institutional reform; *(ix)* coherence between the national planning system and global initiatives; *(x)* awareness-raising; *(xi)* national political commitment; *(xii)* international commitment.

Various forest-related legislative and regulatory reforms were introduced in some tropical countries as of 1995, in line with the framework proposed by the NFPs, as we shall see later.

### 2.1.3. *The United Nations Forum on Forests (UNFF)*

Following on from the IGF/IFF process, the New York-headquartered UNFF, created in 2000 by Resolution 2000/35 of the United Nations Economic and Social Council (ECOSOC), was tasked with various objectives to be reached before the expiry of its mandate (in 2007), including promoting the implementation of the IGF/IFF's proposals for action and defining a binding international agreement on forests. For technical support and the analysis and implementation of these proposals, the UNFF had to rely to a large extent on the Collaborative Partnership on Forests (CPF).[19] Despite high expectations, what the UNFF had actually achieved by 2007 amounted to the creation of an instrument that was not legally binding for all types of forest (United Nations, 2007).

Still framed by this international momentum, forest policy revisions were carried through more systematically from 1995 and, in some countries, these were pursued with the advantage both of hindsight and the assessments of TFAPs already in place. Monitoring reports and information exchange between countries during the UNFF meetings enabled the participants to assess the efforts and major orientations required for NFPs in countries with the most serious development issues in the forestry sector. Today, at least 131 countries worldwide have defined and set up an NFP. More than 94% of the total forest area in the three tropical basins are covered by such plans (FAO & ITTO, 2011).

In addition to this international drive to address forest issues, which mainly aims to frame the formulation of national forest policies in tropical countries, other international environmental agreements and conventions (more or less legally binding) with a direct or indirect bearing on forests have been adopted at the international level.

[19] The CPF was set up in 2001 to support the approach and work of the UNFF. Its role is to ensure collaboration between the main international organisations responsible for forest governance. Its members include UNEP, UNDP, the World Bank, FAO, ITTO and the Secretariats of the UNFF, the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), the United Nation Commission for Sustainable Development (UNCSD), the Global Environment Facility (GEF) and the IUCN, as well as research bodies such as the World Agroforestry Centre (ICRAF), Centre for International Forestry Research (CIFOR) and the International Union of Forest Research Organizations (IUFRO). The UNFF and CPF are known under the joint name of International Arrangement on Forests (IAF) (Guéneau, 2006).

### 2.1.4. *The inclusion of forests in international environmental framework conventions*

As we pointed out in Part 1, the Rio Earth Summit was unable to define and adopt a legally binding international forest convention. However, various pre- and post-1992 international environmental agreements touch on the issue of forest ecosystems and include reference to forests even though these are not the central concern. Table 3 lists the most important of these conventions.

**Table 3** *List of international agreements and conventions relating to forest issues*

| Forest-related agreements and framework conventions | Signature | Year of entry into force | Deals exclusively with forests | Includes forests | Includes legal elements relating to forests |
|---|---|---|---|---|---|
| Ramsar Convention on Wetlands (RCW) | 1971 | 1975 | | x | |
| World Heritage Convention (WHC) | 1972 | 1975 | | | x |
| The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) | 1973 | 1975 | | | x |
| Convention on Migratory Species (CMS) | 1979 | 1983 | | | x |
| Convention on Long-Range Transboundary Air Pollution (CLRTAP) | 1979 | 1983 | | | x |
| Vienna Convention for the Protection of the Ozone Layer (VCPOL) | 1985 | 1985 | | | x |
| Convention on Indigenous and Tribal Peoples (CITP) | 1989 | 1991 | | | x |
| Rio Declaration on Environment and Development (RDED) | 1992 | 1992 | | x | |

| Forest-related agreements and framework conventions | Signature | Year of entry into force | Deals exclusively with forests | Includes forests | Includes legal elements relating to forests |
|---|---|---|---|---|---|
| Statement of Forest Principles (SFP) | 1992 | 1992 | x | | |
| United Nations Convention on Biological Diversity (CBD) | 1992 | 1993 | | x | |
| United Nations Framework Convention on Climate Change (UNFCCC) | 1992 | 1994 | | x | |
| Marrakesh Agreement establishing the World Trade Organization (WTO) | 1994 | 1994 | | | x |
| United Nations Convention to Combat Desertification (UNCCD) | 1994 | 1996 | | | |
| International Tropical Timber Agreement (ITTA) | 1996 | 1996 | x | | |
| 2006 International Tropical Timber Agreement (ITTA) | 2006 | 2006 | x | | |
| Non-binding legal instrument covering all types of forest | 2007 | 2007 | x | | |

*Source: based on Guéneau (2006).*

For example, the Ramsar Convention on Wetlands (RCW) defined in 1971 and adopted in 1975 (United Nations, 1975a) touches on forests in that it gives a special protection status to mangrove forests. It defines the legal basis for the application of mangrove management principles as well as various possibilities for securing financial and technical resources for this management.

Another example is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (United Nations, 1975b), opened for signature in 1973 and adopted in 1975. This covers numerous species typically found in tropical forests and lists them under different categories governed by specific regulations and binding legal regimes.

The three framework conventions drawn up in Rio in 1992, which came into force in 1993, 1994 and 1996 respectively, also address the question of forests.

- Under the CBD (United Nations, 1993), the Sixth Conference of the Parties to the Convention on Biological Diversity (COP6),[20] held in 2002, examined the question of forest issues for the first time and adopted an expanded work programme (Decision VI 22) with twenty-seven objectives, each involving some hundred activities. Talks then continued with the idea of adopting an additional protocol to the CBD dealing more specifically with the issues of tropical forest conservation and protection. However, negotiations gridlocked and the proposal failed to materialise: on the one hand, forest countries did not want forest issues to be addressed multilaterally through several bodies and, on the other hand, developing country members strongly opposed it on the grounds that forests should not be dealt with exclusively from the standpoint of biodiversity conservation as they were also vectors for economic growth. The only component that has survived today is a work programme encouraging the Parties to respect the convention on a purely voluntary basis in line with their national priorities and needs.
- The UNFCCC (United Nations, 1994) and the Kyoto Protocol address the subject of forests through the prism of carbon storage. The only consideration given to forest issues is limited to afforestation projects in developing countries. International negotiations nonetheless opened in 2005 on the questions of Reducing Emissions from Deforestation and Forest Degradation (REDD). These mechanisms are examined in greater detail in Part 3.
- The UNCCD (United Nations, 1996) sets out, among other things, priority actions to combat desertification problems as well as land degradation, particularly forestland, and provides a raft of financial support measures, along with a call for active scientific cooperation. Fifty-eight countries ratified this convention in 1996 and have since participated in implementing national action programmes targeting these issues.

While our objective here is not to give a detailed picture of all the multilateral conventions and agreements relating to tropical forests, it is nonetheless important to bear in mind that the countries that ratified these – including many tropical

[20] The signing of each convention at Rio launched a negotiating process between the signatories (States) to the convention in question. For each convention, the Parties meet annually at a Conference of the Parties (COP), which carries a number that increments with each year passed since the first COP.

countries – have formally committed to addressing the theme of forests and sustainable forest management (*cf.* Table 3).

As a result, what now seems to characterise this emerging international forest regime is a complex legal and institutional fabric managed by several authorities (Singer, 2003; Karsenty *et al.,* 2008). This fragmentation of commitments operating through a multitude of regulatory bodies has also led to a proliferation of norms, standards and reference frameworks intended to promote "good practices" and ensure their evaluation and certification (Leroy & Lauriol, 2011). We will be looking at the concrete mechanisms that have developed out of this later. It is important, however, not to underestimate the effect that this international legal and institutional process can have at the national level. This is the topic that we will now examine. It should also be pointed out that regional-level partnerships are also being developed that facilitate – and even overshadow – international negotiations. One example of this is the creation of Forestry Commission of Central Africa (COMIFAC) in 2005, enshrined at the Central African Heads of State Summit in Brazzaville. Today, the COMIFAC is the institution responsible for coordinating sub-regional operations and actions aimed at SFM and ecosystem conservation (COMIFAC, 2005). In parallel, at the 2002 Johannesburg World Summit on Sustainable Development (WSSD), twenty-nine IGOs and NGOs encouraged the setting-up of a public-private partnership in the Congo Basin, known as the Congo Basin Forest Partnership (CBFP), to ensure coordination between the partners and promote the orientations validated by COMIFAC members. Initiatives of this type are also found in the other basins, such as the Amazon Cooperation Treaty Organization (ACTO) and the Asia Forest Partnership (AFP) (FAO & ITTO, 2011).

Although there is no framework convention on forests, these results (*cf.* Table 3 and Box 2) show not only that several international environmental conventions apply to tropical forests and commit the signatory parties, but also that several forest-specific international agreements, plans and programmes exist, helping to structure national forest policies of the tropical countries and encouraging regional partnerships.

## Box 2 *The evolution of the international debate on tropical forests (highlights)*

**1945 :** Creation of the Committee on Forestry (COFO), a specialist body under the FAO dealing with forest matters.

**1983:** ITTA. Failure of the negotiations on "commodity agreements" to regulate and facilitate trade. Setting-up of an international forest observatory.

**1986:** Creation of ITTO; tasked with monitoring the creation of ITTA.

**1990:** G7 Declaration (Houston, USA); attempt to establish a legally binding forest convention.

**1990:** Bali Declaration (Indonesia). Framework for the ITTO Year 2000 Objective.

**1992:** Rio Earth Summit (Brazil). Statement of Forest Principles, the Rio Declaration and Agenda 21.

**1992:** Adoption of UNFCCC and the CBD.

**1993:** Second Ministerial Conference in Helsinki (Finland). Definition and promotion of sustainable forest management. Discussion on measurable criteria and indicators for good forest management.

**1993:** Creation of the Forest Stewardship Council (FSC) on the initiative of the WWF, other NGOs and private partners. Definition of international standards for sustainable forest management.

**1994:** Renegotiation of ITTA. Integration of the ITTO Year 2000 Objective. A non-binding agreement stipulating that all exported tropical timber products must be sourced from sustainably managed forests.

**1994:** Adoption of the UNCCD.

**1995:** Creation of the IGF, tasked with monitoring the objectives of the Rio Summit.

**1997:** Creation of the IFF, which replaced the IGF (with the same objectives).

**1999:** Creation of the Programme for the Endorsement of Forest Certification (PEFC) – a private initiative for the ecocertification of wood products – on the basis of the principles, criteria and indicators (PC&I) established at the Second Ministerial Conference in Helsinki (1993).

**2000:** Creation of the UNFF, a subsidiary body of the United Nations ECOSOC, responsible for preparing within five years a mandate to establish a binding legal framework for all types of forest.

**2001:** Creation of the CPF, tasked with improving coordination between the organisations responsible for forest questions. It also serves as a support for the work of the UNFF.

•••

•••

**2002:** Implementation of the Forest Law Enforcement and Governance (FLEG) process and its regional sub-components (AFLEG in Africa, ENAFLEG in Europe and North Asia, ASEANFLEG in Southeast Asia). An instrument to monitor the legality of trade and governance in the forestry sector, steered by the World Bank.

**2002:** Sixth Conference of the Parties to the CBD (COP6). Adoption of a broader scope for work on biological diversity. The possibility raised of a process to supplement the CBD by including forests.

**2003:** Publication by the EU of the Action Plan to enforce forest regulations, governance and trade (FLEGT). Aimed at setting up bilateral agreements between States importing and exporting tropical timber products.

**2005:** COP11 under the UNFCCC: emergence of the REDD+ process.

**2007:** Adoption of the non-legally binding instrument for all types of forests.

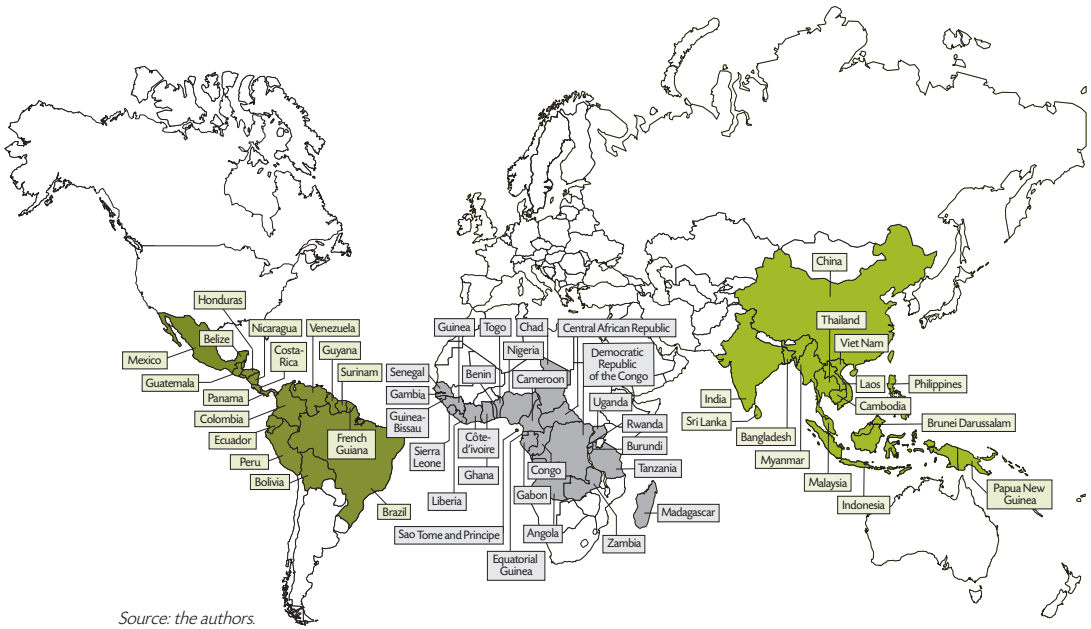
**2011:** Oslo Conference on the creation of a legally binding agreement for managing Europe's forests.

## 2.2. The dynamics of forest-related legislative production in tropical countries

The analysis presented here involves fifty-six tropical countries identified through a simplified mapping of terrestrial biomes. For each of these countries, the national territory is covered either wholly or partly by tropical or subtropical rainforest (*cf.* Map 1).[21]

[21] Some island countries (Caribbean, etc.) were left out of the study given that the corresponding tropical forest areas are much more limited. Some countries with a relatively small area of tropical rainforest were nonetheless included due to their regional importance and their influence on the international forest policies..

## Map 3 *Countries covered by this study*




*Source: the authors.*

We then drew on FAO's legislative database[22] to establish a list of legal texts and associated regulations referring to forests, and more specifically to SFM. We selected 334 texts[23] dating from 1907 to 2011 out of a total 56 countries, which enabled us to analyse the legal and institutional frameworks for each country (*cf.* Appendix 1). These texts are written in four languages: 128 in English, 118 in Spanish, 74 in French and 14 in Portuguese. Their status varies somewhat depending on the legal system governing them (*cf.* Box 3).

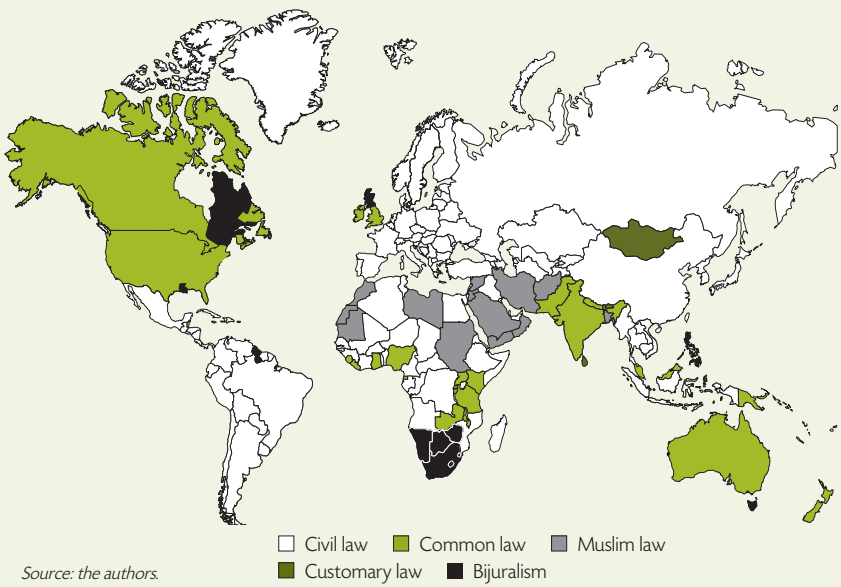
[22] FAOLEX is a comprehensive and up-to-date computerised legislative database containing the world's largest electronic collection of national laws and regulations, as well as international treaties, on food, agriculture and renewable natural resources. http://faolex.fao.org/faolex/index.htm

[23] The FAOLEX legislative database aims to be exhaustive, but certain texts were unavailable for our referencing purposes.

## Box 3 *International legal systems and a plurality of norms*

The notion of a legal system refers to all of the structures and operating procedures linked to the enforcement of the rule of law in a given context. Each country is characterised by the fundamental uniqueness of its legal system insofar as this is elaborated in a precise national setting and depends on the legacy that it has inherited from its history of customary practices. There are four major legal systems in the world (*cf.* Map 2). These include: civil law, common law, customary law and religious law (here mainly Muslim law). Moreover, some countries use, to varying degrees, several legal systems concurrently. This is referred to as bijuralism.

### Map 2 *The different legal systems worldwide*




*Source: the authors.*

Cross-country comparisons of legal texts can be a complex matter on two counts. Firstly, within the same legal system, legal texts do not carry the same weight. A country's legal system is hierarchically structured such that the legal force of the norm depends on the body responsible for issuing it (in the French system for example, a *"loi"* does not have the same force as a *"décret"*, which does not have the same force as an *"arrêté"*).

•••

In addition, the terminological differences inherent to each system may induce a significant bias if seemingly equivalent terms and their jurisdictional force are confused. (A *loi* in the Francophone system will not have the same value as a *law* or *act* in the Anglo-Saxon system). Given these difficulties, a great deal of caution has been taken in analysing the texts presented here (the different types of text are summarised in Table 4).

**Table 4** *Non-hierarchical list of the different types of legal texts in the corpus studied, by language*

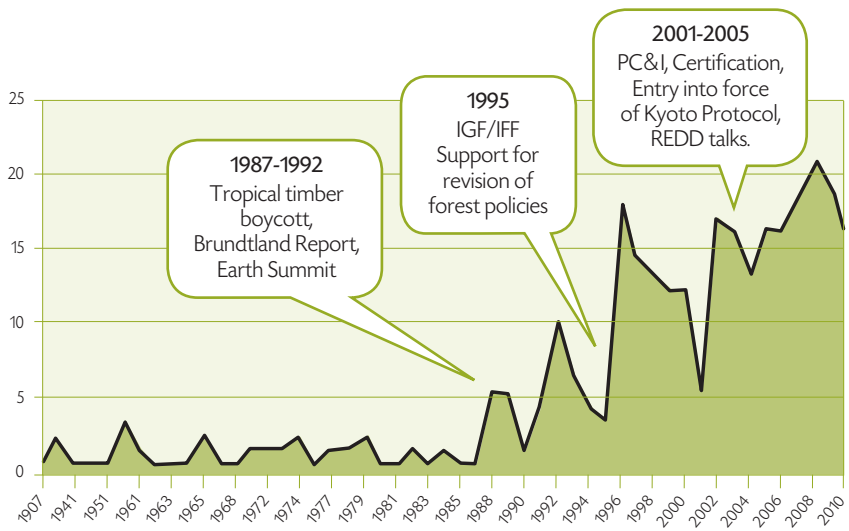
| Texts in French | Texts in English | Texts in Spanish | Texts in Portuguese |
|---|---|---|---|
| Traité | Policy | Politica | Lei |
| Code | Law | Ley | Decreto |
| Loi | Act | Decreto | |
| Décret | Enactment | Acta | |
| Ordonnance | Decree | Reglamento | |
| Arrêté | Rules | Resolución | |
| Circulaire | Regulation (Government) | Acuerdo | |
| | Order (Administrative/ Executive) | Normativa | |
| | Decision (Council/Legislative) | | |
| | Directive | | |
| | Agreement | | |

*Source: the authors.*

## 2.2.1. *General diagnosis*

If we begin by looking at the historical development of legislative production relating to forests in the fifty-six countries studied, we see that four main periods can be distinguished and correlated with the evolving international dynamics on the forest issues described in the previous chapter (*cf.* Graph 1[24]).

Graph 1 *Evolution of legislative production relating to tropical forests*




*Source: the authors.*

[24] Graph 1 presents the yearly variations in legislative production, taking into account both already existing forest legislation and subsequent legislation, some elements of which relate to forests (the defining framework for private forests, commercial plantations, ecosystem services, protection and conservation of wild plants and animals), as well as various regulatory texts covering both forest management and the resulting forestry activities.

1. Pre-1987: the production of texts appears fairly regular but relatively sparse; thus, before 1987, only twelve countries had already adopted a law specifically relating to forests (*cf.* Graph 2 [25]). Nine countries had regulated their forest law and five countries had adopted a law dealing indirectly with forests (*cf.* Graph 3). In 1987, most tropical countries (44 countries) did not have any forest legislation as such in place.

2. 1987–1994: the production of legal texts starts suddenly in 1987 (*cf.* Graph 1). This can be linked to the fact that the environmental concerns expressed in the Brundtland reports (WCED, 1987) were beginning to emerge and find their way into legislation on an international scale. The production of texts peaked in 1992 before plummeting in 1993 and 1994. This burst may be explained by the fact that tropical countries were keen to produce and showcase – in time for the Rio Summit – their legal and regulatory frameworks for forest ecosystem management. Between 1987 and 1994, ten countries had promulgated a forest law (*cf.* Table 5), three had put in place a regulatory component for this law, five also revised their texts during the period and nine adopted a text that did not directly address the forest question but dealt with forest issues more broadly (*cf.* Graph 3).
   In 1994, twenty-two of the fifty-six tropical countries (40%) thus had brought in a forest law (*cf.* Graph 2).

3. 1995–2000: following its decline from 1993 to 1994, production peaked again in 1995, notably with the enactment of 19 texts in 1996 (*cf.* Figure 2). This rise can be correlated with the systematic revision of forest policies undertaken very slowly at first under the FAO's TFAPs, and then later under the NFPs promoted by the IGF/IFF process. The trend throughout this period is characterised by the promulgation of the first forest codes. [26] Another fourteen countries

[25] Graph 2 presents several phases characteristic of legislative production. Given that our groupings of the different linguistic corpuses allowed us to distinguish the texts in the legislative domain (*Loi,* Law, Act, etc.) from those in the regulatory domain (décret, arrêté, decree, regulation, etc.) (*cf.* Box 3), we identified five landmark steps for each country: *(i)* adoption of the first forest law (*i.e.* when a country enacts a specific law on forest management); *(ii)* regulations under the forest law (*i.e.* when a country promulgates one or more regulatory texts in order to implement its first forest law); *(iii)* adoption/revision of a new forest law or regulations (*i.e.* when a country adopts one or more new laws or regulations concerning forest management); *(iv)* other laws or regulations (*i.e.* when a country adopts one or more laws or regulations that address forest matters only as a secondary concern); and *(v)* no forest legislation (*i.e.* when a country has still not promulgated or adopted any forest law). It should be pointed out that these different phases can overlap. For example, in a given period of time, a country can both promulgate its first forest law, and then adopt its associated regulatory text and subsequently propose a revision of the texts already adopted.

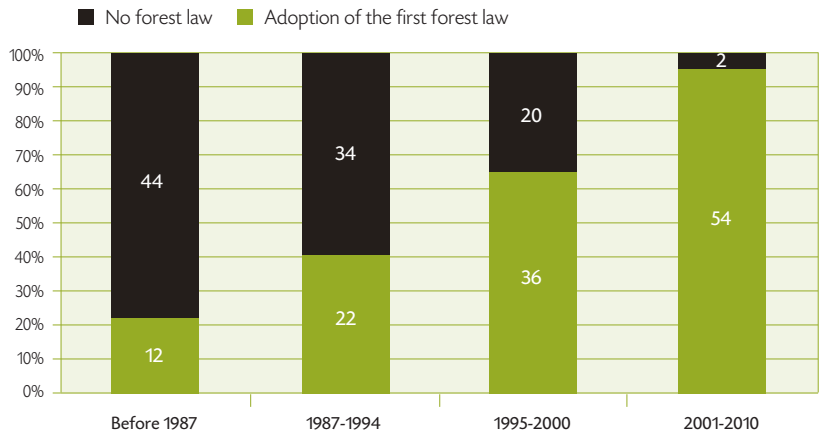
[26] A legal code corresponds to a set of laws and rules formulated by a State. We use this term when we are referring to both legislative and regulatory texts.

introduced a forest law (*cf.* Table 5). Thirteen countries regulated their forest law for the first time (*cf.* Graph 3). Over this period, eleven countries revised their existing forest law and the corresponding implementing decrees and fourteen countries adopted a law incorporating forests as a sub-topic (*cf.* Graph 3). By 2000, a total of thirty-six countries had thus adopted their forest law. This left twenty countries, *i.e.* about 35% of tropical countries, with no forest law (*cf.* Graph 2).

4. 2001–2010: the 2001 trough is followed by a new flurry of legislative activity with a first peak in 2002, a second in 2005 and yet another in 2008 (*cf.* Graph 1). The 2002 peak can be linked to the wish, voiced by a group of institutions (FAO, ITTO, CIFOR, UNFF) both at the Oslo Conference (January 2001) and then the Fifth Conference of the Parties (COP5) on climate change (November 2001), to set up SRM PC&Is within national legal frameworks (which we will return to in Part 3). This period coincides with the Johannesburg Summit, and with the years when changes in public development assistance policy were pushing public-private partnerships centre stage. The second peak in 2005 ties in with the entry into force of the Kyoto Protocol and with the initial talks on the REDD mechanism (which we will come back to later), which required a revision of existing legislation. Many countries (18) adopted their first forest law during this period (*cf.* Table 5). These years also correspond to the most active phase of forest policy revision: this involved twenty-three tropical countries (*cf.* Graph 3). On top of this, between 2001 and 2012, eighteen countries reinforced their legislation through regulatory channels and fourteen countries introduced supporting legislation relating to forest issues (*cf.* Graph 3).
   In 2010, two countries still had no specific forest law, fifty-four did and forty-three had regulated their first forest law (*cf.* Graph 2 and Table 5).

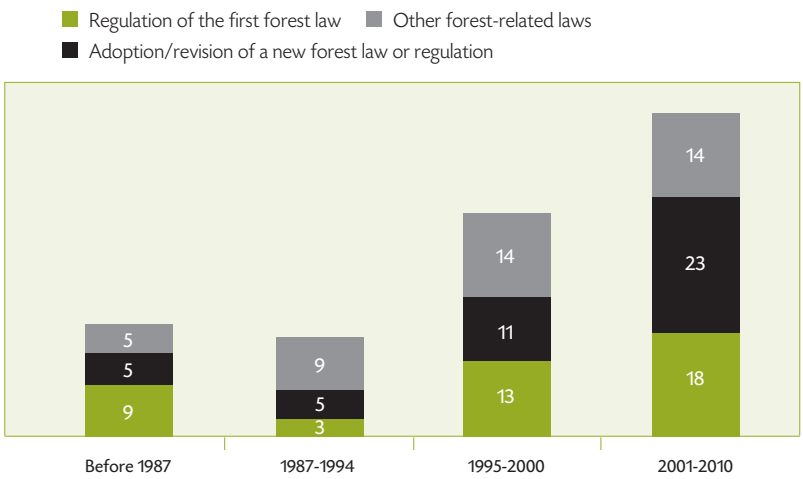
Graphs 2 and 3 show the production of forest-related texts for all of the tropical countries considered.

**Graph 2** *Timeline for the adoption of a country's first forest law*




The results are expressed as the relative percentage of the total number of countries and each column indicates the number of countries involved.

**Graph 3** *Activity involving the regulation, revision and extension of forest laws*




Each column indicates the type of activity and the number of countries concerned.

*Source: the authors.*

**Table 5** *Timeline showing the number of countries (by continent) relative to the phases of production of forest-related legislation*

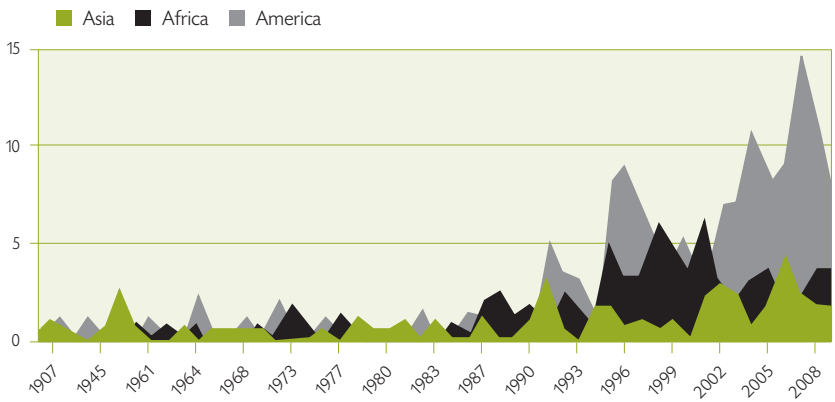
| Period | Tropical region | Phases: Adoption of the first forest law | Regulation of the first forest law | Adoption/ Revision of a newforest law or regulation | Other laws or regulations | No forest law |
|---|---|---|---|---|---|---|
| Before 1987 | Africa | 4 | 3 | 1 | 1 | 22 |
| | America | 3 | 2 | 1 | 1 | 13 |
| | Asia | 5 | 4 | 3 | 3 | 9 |
| | Total | 12 | 9 | 5 | 5 | 44 |
| 1987 1994 | Africa | 6 | 2 | 2 | 2 | 16 |
| | America | 2 | 1 | 1 | 5 | 11 |
| | Asia | 2 | 0 | 2 | 2 | 7 |
| | Total | 10 | 3 | 5 | 9 | 34 |
| 1995 2000 | Africa | 8 | 6 | 3 | 7 | 8 |
| | America | 4 | 5 | 4 | 6 | 7 |
| | Asia | 2 | 2 | 4 | 1 | 5 |
| | Total | 14 | 13 | 11 | 14 | 20 |
| 2001 2010 | Africa | 6 | 7 | 8 | 5 | 2 |
| | America | 7 | 7 | 10 | 7 | 0 |
| | Asia | 5 | 4 | 5 | 2 | 0 |
| | Total | 18 | 18 | 23 | 14 | 2 |
| Results in 2010 | | 54 countries had adopted their forest law | 43 countries had regulated their forest law | There were 44 phases of revision and/or adoption of a new forest law or regulation | There were 42 phases of adoption of a law or regulation addressing forests as a secondary concern | 2 countries do not yet have a forest law |

*Source: the authors.*

## 2.2.2. *Regional differences*

A complementary study, by geographical region, highlights some of the differences between the three tropical basins (*cf.* Graph 4).

Graph 4 *Changes in the number of forest-related legal texts by year for each tropical region*



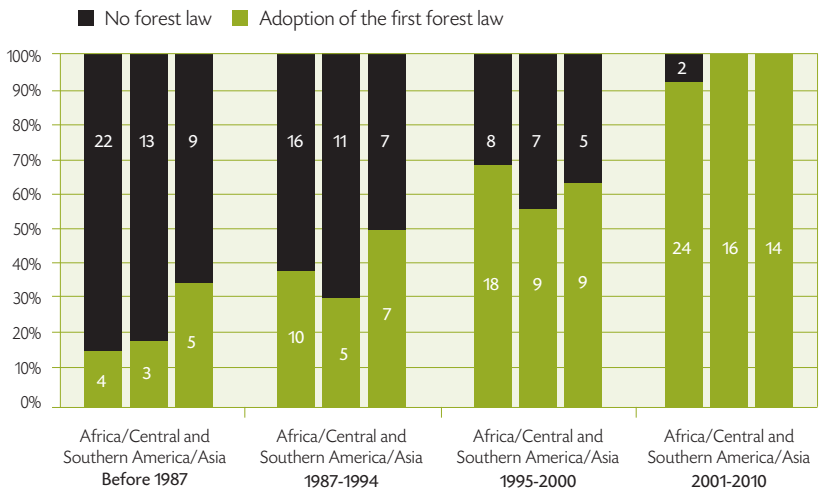

*Source: the authors.*

The pre-1987 period shows a higher production of texts for Asia overall. Over this period, 24 texts are produced in Asia, 12 in Africa and 11 in South America. Production in Asia remains relatively steady until 2010 with a slight increase as from 2002. For Africa, production picks up from 1987 and remains relatively active until 2010, the most productive stretch being from 1996 to 2003, which corresponds to the period when the NFPs were being set up. For Central and South America, production really begins in 1992 and then increases until 1999 before dropping off sharply. From 2002, the number of texts produced in this region is once more on the rise and remains substantial until 2010. This dynamic corresponds to the period when the prevailing rationale was to encourage the implementation of criteria and indicators as well as market-based instruments, which required a revision of forest laws and other legislation that touched on forest issues.

As far as the first forest law and its regulations are concerned (*cf.* Graphs 5 et 6), the dynamics for each period are largely the same across the different regions. Asia, however, seems a little faster off the mark in terms of the number of countries involved (pre-1987) followed by Africa (post-1995) and later America (post-2000). What is also clear is that regulatory activity soon takes over from legislative activity, indicating a general political will to implement the new laws.

Graphs 5 and 6 show the production of forest-related legal texts for each of the tropical regions studied.

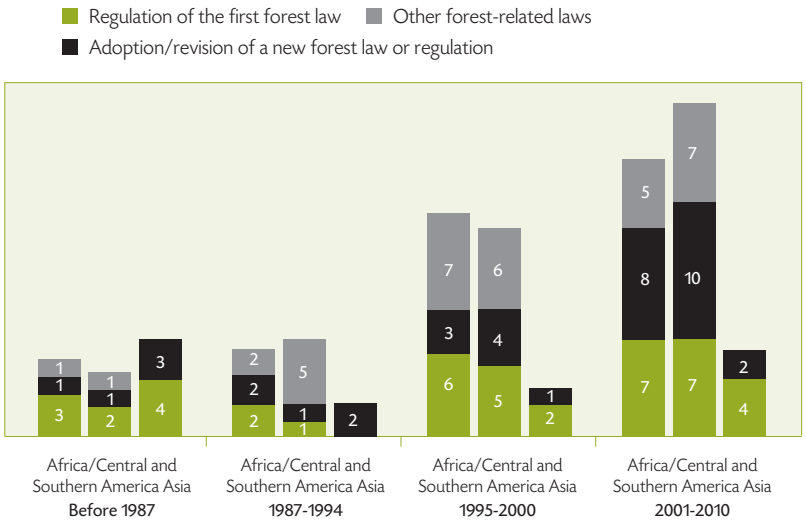
**Graph 5** *Timeline for the adoption of a first forest law*




The results are expressed as the relative percentage of the total number of countries studied and each column indicates the number of countries for each region.

*Source: the authors.*

**Graph 6** *Activity involving the regulation, revision and extension of forest-related legislation*




Each column indicates the number of countries studied, by region and type of activity.

*Source: the authors.*

The peaks in legislative and regulatory activity do not occur at exactly the same periods in the three tropical regions. The production of laws incorporating forests as a sub-topic (*cf.* Graph 6) is seen more particularly in Central and South America, which would seem to indicate that this region has a less sector-based approach than the two others.

Having completed the analysis of the dynamics of legislative and regulatory activities, we will now turn to the actual content of forest policies.

## 2.3. Analysis of forest policy content

In this section, we ask the following questions: to what extent do the texts studied contain references to SFM, and what themes are addressed? This content analysis only covers French- and English-language texts and does not extend to an analysis of South American countries.[27]

### 2.3.1. *What reference is made to sustainable forest management?*

An initial analysis of the legal text corpus compiled for this part of the study[28] (202 English- and French-language texts) shows first of all that most of the texts belonging to the corpus of tropical country forest policy make no mention of SFM or related subjects: out of the 128 English-language texts studied, only 21 refer to it and, out of the 74 French-language texts, only 20 address these questions. In total, therefore, 41 documents involving 27 African and Asian countries refer to SFM. Two types of reference are to be found:

- some countries refer to SFM explicitly. Of the 27 countries mentioned earlier, this is the case for 13 countries (*cf.* Table 6), of which 3 make direct mention of it in the title of their forest policy[29] (*cf.* Table 7). Most often, the references are to regulations that clarify the enforcement of the forest law. For these countries, the terms *"gestion durable des forêts", "aménagement durable des forêts"* and the English *"sustainable forest management"* or other variations of the French and English terms ("gestion durable des ressources", etc.) are repeatedly used in the text. However, the concept of SFM itself is never clearly defined;
- the 14 remaining countries that refer to SFM make implicit reference to this concept, meaning that the term *"gestion durable des forêts/sustainable forest management"* in not named as such. The idea of *"sustainability/durabilité"* is nonetheless touched on through the mention of concepts such as *"développement durable/sustainable development"* or *"développement durable du*

[27] Our analysis drew on the corpus of legal texts that we had compiled (334 texts). However, due to insufficient language skills, we decided to exclude the 132 texts from the hispanophone and lusophone countries. The analyses presented hereafter are thus based on 202 legal texts (legislative, regulatory, etc.), including 128 texts in English and 74 in French, covering 22 African countries, 14 Southeast Asian countries and 3 South American countries.

[28] The analysis involved searching the title and body of the 202 selected texts for the frequency of the French terms *"gestion", "durable"* and a few related terms such as *"aménagement durable", "gestion soutenable", "gestion rationnelle", "gestion participative",* etc. The same methodology was used for the English-language texts based on the equivalent English terms.

[29] This involves Cameroon, the Congo and the Philippines.

*secteur forestier/sustainable development of the forestry sector"*. Six of them use a very different terminology that is nonetheless quite closely related, such as "community forest management", "sustainable yield management", *"gestion rationnelle et équilibrée"*, etc. (*cf.* Table 6).

**Table 6** *References to SFM in the legal texts from the African and Southeast Asian countries*

| Country | Year | Legal type | Number of texts | Reference to "Sustainable Forest Management" | | Terminology / Semantics |
|---|---|---|---|---|---|---|
| | | | | Explicit | Implicit | |
| **Africa** | | | | | | |
| Benin | 1996 | Décret | 1 | x | x | "Gestion durable des forêts" "Gestion participative" |
| Burundi | - | - | - | - | - | - |
| Cameroon | 1994 - 1995 | Loi - Décret | 2 | x | x | "Gestion durable des forêts" "Gestion participative" "Gestion intégrée" "rendement soutenu" |
| Central African Rep. | 1990 | Loi | 1 | | x | "Gestion rationnelle et soutenue de l'écosystème forestier" |
| Chad | 1998 | Loi | 1 | | x | "Gestion rationelle et durable de l'environnemment et de ses ressources" |
| Congo (Rep.) | 2000 - 2007 - 2009 | Loi - Arrêté (x2) | 3 | x | x | "Aménagement rationnel des ressources" "Gestion concertée et participative" |
| Congo (DR) | 2002 - 2006 | Loi - Arrêté (x2) | 3 | x | x | "Gestion durable des forêts" "Gestion rationnelle des ressources" |
| Côte d'Ivoire | - | - | - | - | - | - |

| Country | Year | Legal type | Number of texts | Reference to "Sustainable Forest Management" | | Terminology / Semantics |
|---|---|---|---|---|---|---|
| | | | | Explicit | Implicit | |
| Gabon | 2001 | Loi | 1 | x | | "Gestion durable des forêts" |
| Gambia | 1998 | Act | 1 | | x | "Community forest management" |
| Ghana | 1997 | Act | 1 | | x | "Sustainable management of timber resources" |
| Guinea | 1999 | Loi | 1 | | x | "Gestion rationelle et équilibrée" |
| Liberia | 2003 | Act | 1 | x | | "Sustainable protection forest management" |
| Madagascar | 1997 - 2005 | Loi (x2) - Décret (x2) | 4 | x | x | "Gestion durable des forêts" "Gestion durable des aires protégées' |
| Nigeria | - | - | - | - | - | - |
| Uganda | 1995 | Act | 1 | - | - | "Sustainable protection forest management" |
| Rwanda | - | - | - | - | - | - |
| Senegal | 1998 | Loi | 1 | | x | "Bonne gestion forestière" |
| Sierra Leone | - | - | - | - | - | - |
| Tanzania | 1996 | Act | 1 | x | x | "Sustainable forest management" "community forest management" |
| Chad | 1998 | Loi | 1 | | x | - |
| Togo | 2008 - 2009 | Loi - Décret | 2 | x | | "Gestion durable des forêts" |
| Zambia | 1999 - 2006 | Act - Regulations | 2 | x | x | "Sustainable forest management" "Joint forest management" |

| Country | Year | Legal type | Number of texts | Reference to "Sustainable Forest Management" | | Terminology / Semantics |
|---|---|---|---|---|---|---|
| | | | | Explicit | Implicit | |
| **Asia** | | | | | | |
| Bangladesh | - | - | - | - | - | - |
| Brunei Darussalam | - | - | - | - | - | - |
| Cambodia | 2003 | Law | 1 | | x | "Sustainable management of forest resources" "Community forest management" |
| China | - | - | - | - | - | - |
| India | 2003 | Rules | 1 | | x | "Sustainable use of biodiversity" |
| Indonesia | 1999 | Act | 1 | x | | "Sustainable forest management" |
| Laos | 2007 | Law | 1 | | x | "Sustainable management of forest resources" "Sustainable logging" |
| Malaysia | 1992 | Act | 1 | | x | "Sustainable development of forest resources" |
| Myanmar | 1992 | Law | 1 | | x | "Sustained yield of forest products" |
| Papua New Guinea | 1991 | Act | 1 | | x | "Sustained yield of forest products" |
| Philippines | 1995 - 2007 | Executive Order - Act (x2) | 3 | x | | "Sustainable forest management" "Community based forest management" |
| Sri Lanka | 2009 | Act | 1 | | x | "Sustainable management of forest resources" |
| Thailande | - | - | - | - | - | - |
| Vietnam | 2004 - 2006 | Law - Decree - Directive | 3 | x | | "Sustainable forest management" |

*Source: the authors.*

Table 7 *Explicit reference to SFM in title of the legal texts, by country*

| Country | Year | Legal type | Title of legal text |
|---|---|---|---|
| **Africa** | | | |
| Cameroon | 1999 | Arrêté | Arrêté portant création d'un Comité permanent de suivi de la mise en œuvre des résolutions de la Déclaration de Yaoundé sur la conservation et la gestion durable des forêts tropicales |
| Congo | 2007 | Arrêté | Arrêté définissant les directives nationales d'aménagement durable des concessions forestières |
| Congo | 2009 | Arrêté | Arrêté portant création du comité de pilotage du projet d'appui à la gestion durable des forêts du Congo |
| Congo | 2009 | Arrêté | Arrêté fixant les modalités de mise en œuvre du projet d'appui à la gestion durable des forêts du Congo |
| **Asia** | | | |
| Philippines | 2007 | Act | An Act Providing for Sustainable Forest Management |
| Philippines | 2009 | Act | An Act Providing for Sustainable Forest Management |
| Philippines | 2010 | Act | An Act Providing for Sustainable Forest Management |
| Philippines | 2007 | Act | An Act Providing for the Sustainable Management of Forest Resources and for Other Purposes |
| Philippines | 2010 | Act | An Act Providing for the Sustainable Management of Forest Resources and for Other Purposes |
| Philippines | 2008 | Rules | Guidelines and procedures for the recognition, documentation, registration and confirmation of all Sustainable Traditional and Indigenous Forest Resources Management Systems and Practices (STIFRMSP) of Indigenous Cultural Communities or Indigenous Peoples in ancestral domain/land |

*Source: the authors.*

Although national forest jurisdictions often vary from one country to another, a more detailed study of the 202 texts selected for this content analysis enabled us to identify various trends, which are presented below. What appears above all from this analysis is that older jurisdictions (reassertion of State sovereignty and the control of rights of use) are maintained but combined with new elements responding to SFM needs.

## 2.3.2. *The legacy of former forest jurisdictions*

### The reassertion of State sovereignty: the public forestry regime

Following the Statement of Forest Principles adopted in 1992: "States have…the sovereign right to exploit their own resources pursuant to their own environmental policies" (United Nations, 1992b, Principles/Elements 1[a]). On this count, an analysis of the texts revealed that forest codes have remained remarkably consistent with respect to the State's sovereignty over forest resources. This sovereignty materialises in the fact that the State is granted permanent ownership rights over forests and the resources they provide, in the demarcation of public forests and/or in a heightened control over the arrangements for state management of forests: "Forests are State property" (République démocratique du Congo, 2002*b*, Art. 7). "Forest resources are a good of national interest. As such, they shall be subject to a system of protection that ensures their sustainable management" (République togolaise, 2008, Art. 3). "All forests within the territory of the Republic of Indonesia, including the natural wealth contained therein, are controlled by the State for the maximum prosperity of the people" (Republic of Indonesia, 1999, Art. 4). This trait appears to be relatively common in French-speaking countries (Granier, 2008) as well as in some of the Asian countries, formerly under British rule, that inherited the colonisers' principles of the State's appropriation of forest resources.

Yet, some specific characteristics operative in the setting up of forest areas should be mentioned. In the Congo Basin,[30] for example, one can find publicly owned permanent forest estate, non-permanent (publicly owned) forest estate, private forest estates, rural forest estates, etc. In Asia, it seems that the system has evolved towards greater decentralisation.

Most often, private ownership regimes are addressed in the legal texts on forests. The arrangements and conditions for access to ownership rights are nonetheless so complex that exercising them remains an extremely vague topic, especially in Africa. As a rule, one needs to prove possession of a longstanding land title and that the forest in question has been planted intentionally and is not natural forest, as the example from the Congo shows: "Any natural person…who plants forest trees on land that is not part of the non-permanent forest estate acquires the exclusive use of the planted land and ownership of the trees thereon, under certain conditions: third party rights; the number of planted trees must exceed the number of non-

[30] For further details, refer to the CBFP's (2008) comparison of the legal frameworks in the six countries in the Congo Basin.

planted trees; the limits of the planted land must be clearly demarcated" (République du Congo, 2000, Art. 36). In the Anglo-Saxon countries of Africa and Asia, the logic of private tenure applies to land titles belonging to natural persons as well as land titles established in the name of collective bodies (village, municipality, etc.): "private forests which are: forests on village land held by one or more individuals under a customary right of occupancy; forests on general or village land of which the rights of occupancy or a lease has been granted to a person or persons or a partnership or a corporate body or a non-governmental organisation or any other body or organisation for the purpose of managing the forest which is required to be carried out in accordance with this Act" (United Republic of Tanzania, 2002, Art. 4); "Any individuals that plant trees on private land or on state forest land where they have granted user rights, have the right to maintain, develop, use, sell, and distribute their products" (Kingdom of Cambodia, 2003*a*, Art. 46).

Thus, although there are differences in legislation on forest land tenure and access to forest resources, public ownership is clearly the most preponderant in terms of the area covered (FAO & ITTO, 2011). Moreover, whatever tenure system is in place, the State systematically retains the right of oversight and intervention.

## Restriction of user rights

The increasingly dynamic production of texts also led to greater restrictions on the length of the harvesting period and on the range of exploitable resources (Nguiffo, 2008). Any harvesting of forest resources for economic purposes must thus be justified and validated by forest administrations. Harvesting is closely controlled for production activities in the case of state-owned forests (concessions, operating permits) and is generally more flexible for community and privately owned forests. Yet, the search for sustainability seems to have driven a trend towards greater management and restriction of user rights, even in situations where management should preferably be decentralised so as to empower communities to make decisions autonomously. This is what the following Central African and Cambodian examples illustrate: "The natural reserves and reforestation areas are not subject to customary use rights" (République centrafricaine, 1990, Art. 17); "Communities…may harvest, process, transport and sell forest products and NTFPs in accordance with the following conditions: – Harvest of forest products for selling or bartering shall not be allowed within the first 5 years of approval of the Community Forest Management Plan; - Payment of any required royalties or premiums on forest products and NTFPs as prescribed in Article 55 of Forest law; and – Terms and conditions in an approved Community Forest Management Plan" (Kingdom of Cambodia, 2003*b*, Art. 12).

These themes were thus already present in forest policies but the advent of SFM saw the introduction of new elements, which we will now consider.

## Modernisation of forest policies

Backed by international cooperation, the main innovations in forest policies involved regulating the standardisation of management instruments, more specifically management plans for African countries, so as to optimise logging activities and improve sustainability.

### *Mapping tools and land allocation plan*

For some countries, the decision to optimise land-use planning translated into the promulgation of regulations mainstreaming the use of tools for mapping, land demarcation and land-use planning and the assignment of forest staff: "a site plan describing the limits of the said forest, together with a geographical map drawn to the scale 1:200000 and a copy of the land-use plan of the region concerned" (République du Cameroun, 1995, Art. 17; Republic of Indonesia, 1999; Socialist Republic of Vietnam, 2004; Lao People's Democratic Republic, 2007). The mapping of land rights and uses in the different forest estates is most often based on the many socio-economic, ecological, political and geographic studies conducted in the developing countries over the last fifty years. The purpose is to identify the most disturbance-prone areas that need greater attention. It also provides a forward view of the use of resources and their economic valuation (Nguiffo, 2008).

### *The mainstreaming of management plans*

As we showed in Part 1, forest management as such is not a novelty. What is totally new, on the other hand, is that it has been widely disseminated and operationalized through the definition and implementation of "management plans". This is particularly the case in the Congo Basin (Nguiffo, *ibid.*).[31] The objective and structure required of a management plan and its ensuing implementation are often detailed in a country's main forest law or a specific regulatory decree (République centrafricaine, 1991; République gabonaise, 1993; République du Cameroun, 2001; République démocratique du Congo, 2002*a*; République du Congo, 2006). However, there are still countries where the legislators have refrained from clarifying the concepts involved insofar as no substantive details have been given on the content that is to be included into these management plans (République du Burundi, 1985; République centrafricaine,

[31] We consider that the term "innovation" can be used to talk about Africa insofar as almost no management planning framework existed before the forest policy reforms.

1990), or they have simply proposed an open-ended list of items to be taken into account in a management plan (République du Rwanda, 1988, Art. 46; République gabonaise, 2001, Art. 21).

The outlines of management plans are more detailed in French-speaking countries than in Asian countries. In Southeast Asia, the trend has evolved differently, as Asia has long had planning schemes in place for the use of resources (FAO, 2011). Thus, one cannot speak of innovation as such.

The plans to be adopted are scantily detailed in the legal texts of the Asian countries. In fact, responsibility is delegated to the "appropriate institutions", in line with the processes for decentralising forest administration in these countries (CIFOR interview; Texier & Kante, 2005): the management plans must put in place in accordance with the national framework and must comply with national development plans, but their design is transferred to subnational or subregional tiers of decision-making bodies (sometimes even to the rural community level). The Forest Law in Papua New Guinea well illustrates this: it requires that national plans, provincial plans, a five-year working plan and annual logging plans for the same forest units be drawn up (Independent State of Papua New Guinea, 1991).

Within these broad trends, each country has developed its own specific national legal framework and management plans do not have the same legal force from one country to another. In some countries, while the law stipulates that forestry operations must fully comply with management plans (République de Guinée, 1999) or face administrative penalties (République du Sénégal, 1999), in other countries, violating this requirement may constitute a criminal offense (République du Congo, 2000). Finally, some countries give management plans the status of a contract between the State and the logger and are only required for applications for concessions (République du Cameroun, 1994).

### *Forest concessions are more extensive and carry sustainable management requirements*

The development of forest laws has also made it possible to secure the rights of industrial loggers by facilitating the procedures for exploiting and allocating exploitable areas (Granier, 2008). The allocation model that now seems to be used worldwide is based on forest concessions, and with the gradual introduction of legal reforms, this has become a full-fledged forest management tool. Forest concessions are found in all three tropical basins.[32]. The concessions are of very different sizes, ranging from a few dozen to hundreds of thousands of hectares (Gray, 2002). This system formally delegates the management and exploitation of resources in a state-owned forest estate to a specific entity, for a defined length of time, under more or less restrictive conditions. However, the nature of the titles and rights granted differ from one country to another. The various terms denoting the transfer of forest management from a national government to private operators include permits for logging and management (République centrafricaine, 1990, Art. 27; Republic of the Union of Myanmar, 1992, Art. 17; Republic of the Philippines, 2010, Sec. 3), industrial processing agreements (République du Congo, 2000, Art. 65), logging agreements (République du Cameroun, 1994, Art. 44), industrial forest plantation licenses (Republic of the Philippines, 1991) and forest concessions (Republic of Zambia, 1999, Art. 43; République gabonaise, 2001, Art. 97; Kingdom of Cambodia, 2003a, Art. 13). One of the innovations brought by reforms to this allocation model involves the duration and surface area of forest concessions (Nguiffo, 2008). Although there are differences across countries, many of them have extended the duration and area of concessions so as to encourage loggers to adopt more sustainable practices: loggers thus have more time to amortise their management costs, and more land, which should enable them to cut their losses from illegal logging (Gray, *ibid.;* Texier & Kante, 2005). They are often required by national regulations to draw up and implement a management plan for all concessionary operations, which is also intended to guarantee the sustainability of logging activities. Although there is a will to move towards SFM, the requirements for concessions are not well defined in the legal texts, except for references to punitive measures such as licence cancellation and payment of penalties in case of non-compliance with the terms of the licence.

[32] Mainly in Liberia, Côte d'Ivoire, Ghana, Cameroon, Gabon, Congo, Democratic Republic of the Congo, Central African Republic, Zambia, Malaysia, Indonesia, Papua New Guinea, Cambodia, Myanmar, Philippines, Surinam, Guyana, Venezuela, Bolivia, Nicaragua, Guatemala, Peru and Brazil.

### *Tax advantages for loggers*

For many tropical countries, the exploitation and export of wood resources represents a source of foreign currency. Large-scale logging is generally managed by private investors. In order to ensure a regular income from the logging activities in their forests, most forest laws in Central Africa, and a few in Southeast Asian countries, have introduced tax regimes that are particularly attractive for logging operators.

As a result, the rates of taxes on logging-related activities have been reduced. This is the case in Cameroon, where felling taxes and export duties have been set at 2.5% and 7.5% respectively, both of which are considerably lower than the respective 5% and 40% rates set by previous legislation (Nguiffo, 2008).

In addition to reduced tax rates, there are diverse incentives most often to encourage conservation and plantation activities (République du Côte d'Ivoire, 1965; République du Rwanda, 1988; Republic of the Union of Myanmar, 1992; République de Guinée, 1999; République démocratique du Congo, 2002*b*; Lao People's Democratic Republic, 2007; République togolaise, 2008). All of these tax incentives encourage and benefit private sector operators, who are thus able to manage vast concessions. States that demand lower tax rates transfer their overall responsibilities for SFM to private business. This includes not only responsibility for the economic but also environmental aspects, encouraging loggers to adopt more sustainable practices through conservation measures, and also social aspects, by prompting them to implement participatory management.

### *Legal recognition of "participatory management"*

Another major trend driven by reforms in the forestry sector has been to create and institutionalise norms for community-based management of forest ecosystems. "*Participatory management*" is defined by law in many of the countries [33] and involves transferring rights and management tools from government to local communities. This type of management varies depending on the degree to which management responsibilities are decentralised, ranging from co-management with the State through to the complete transfer of management tools to the communities.

[33] Cf. Republic of the Philippines, 1995; République du Cameroun, 1995, Art. 27; United Republic of Tanzania, 1996, Art. 34; République de Madagascar, 1997, Art. 28; Republic of The Gambia, 1998, Art. 9; Republic of Indonesia, 1999, Art. 3; Republic of Zambia, 1999, Art. 25; République de Guinée, 1999, Art. 19; République du Congo, 2000, Art. 11; République gabonaise, 2001, Art. 156; République démocratique du Congo, 2002*b*, Art. 111; Kingdom of Cambodia, 2003*a*, Art. 40; Republic of Uganda, 2003, Art. 17; Republic of Liberia, 2006, Sec. 10.

For some countries, "*community*"-based participatory management is even cited as a prerequisite for the transition to SFM.[34] Moreover, many laws support the participation of local actors by seeking to integrate them into the formulation of forest policies.[35]

As we have already pointed out, the State most often retains control of the operating modalities as it approves and monitors forest management plans[36] or simplified management plans.[37]

### *Redefining non-commercial forest areas*

Apart from driving changes in public policy on production forests, the incorporation of SFM into national legislation has also led States to (re)define many non-commercial forest areas, some of which are specifically designed to meet the challenges of conserving fragile ecosystems. These forest estates enjoy varying degrees of protection that are generally defined by regulations. Within national borders, there may be an overlapping of different types of forest areas that are not mutually exclusive (depending on national contexts):

- protected areas (national parks, sanctuaries and fauna and flora reserves),
- protection forests (often subject to a specific regime in Asia),
- recreational forests,
- forests designated for education and research,
- replanted forests,
- botanical and/or zoological gardens,
- sacred forests.

[34] *Cf.* Republic of the Philippines, 1995; United Republic of Tanzania, 2002, Art. 3 ; Republic of the Philippines, 2010.

[35] *Cf.* République de Guinée, 1989, Art. 37; République du Cameroun, 1995, Art. 28; Republic of the Gambia, 1998, Art. 59; Republic of Indonesia, 1999, Art. 30; République gabonaise, 2001, Art. 156; Kingdom of Cambodia, 2003a, Art. 67; Republic of Liberia, 2006, Sec. 10.

[36] *Cf.* République de Guinée, 1989, Art. 37; République de Madagascar, 1997, Art. 28; République du Congo, 2000, Art. 45; United Republic of Tanzania, 2002, Art. 20; Republic of Uganda, 2003, Art. 28.

[37] *Cf.* République du Cameroun, 1995, Art. 31; Republic of the Gambia, 1998, Art. 60; République gabonaise, 2001, Art. 156.

All of these areas require management plans, the objectives and contents of which are set by regulation. Their commercial and industrial exploitation is generally limited and requires authorisation from the relevant administration.

Before examining the concrete forms of the management arrangements ostensibly set up as SFM, we continue this section on public forest policy by focussing on the issue of law enforcement, which has received particular attention from the SFM perspective.

## 2.4. Towards better law enforcement: monitoring legality

Despite more than twenty years of intense legal and institutional activity across all continents at both national and international levels, the problems of forest law enforcement and governance are still a matter of concern. Since the late 1990s, the question of controlling illegal practices (in logging and the tropical timber trade) has often been identified as one of the major stumbling blocks to the implementation of SFM. Support from various bilateral and multilateral initiatives, development agencies and donors, NGOs, researchers, private sector actors and numerous experts has led to various actions aimed at reinforcing the institutional and regulatory capacities of States, improving the quality of forestry sector governance and developing even more new regulatory tools to enhance legal compliance and enforcement.

### 2.4.1. *The G8 Action Programme on Forests*

As a first example, the G8 Action Programme on Forests launched in 1998 addressed, among other things, the issue of illegality. More specifically, the G8 undertook a series of actions to assess the nature and extent of the illegal timber trade as well as measures to control directly associated activities. However, the programme garnered varying degrees of commitment from the States and the debate became strongly focused on the need to rapidly put in place a non-binding agreement on forests (Brack, 2007). Despite resistance from some quarters, the interest raised at international level for the problem of illegal practices led to the targeting of priority actions and their inclusion in national programmes. These were supported by bilateral and multilateral funding, ITTO and regional forest partnerships (G8, 2002).

### 2.4.2. *The FLEG initiative*

From the end of the 1990s, the World Bank launched a series of ministerial conferences on the question of forest law enforcement and governance. Their purpose was to secure the political commitment of States and their cooperation at national and

regional level to combat illegal logging, illegal trade in wood products and corruption. They underlined that efforts needed to be pooled and responsibility shared between the governments of timber-producing countries and timber-importing countries, the private sector concerned, NGOs and development agencies (IISD, 2001).

It was in this setting that the Forest Law Enforcement and Governance (FLEG) initiative emerged at the 2001 East Asia Ministerial Conference in Bali (IISD, 2001). Many meetings and talks were held between political leaders on questions of forest law enforcement for forestry sector management and governance. This Asian initiative, ASEANFLEG, was swiftly followed by others: AFLEG for Africa in 2003, ENAFLEG for Europe and North Asia in 2005, as well as others currently being set up (South America, the Caucasus countries).

The participation of the AFP and CBFP, as well as the regional activities of the FAO and ITTO in the field of forest law enforcement and governance, created the momentum needed to set up joint actions. Within the FLEG process, the sharing and exchange of information during the conferences enabled priority actions to be targeted and then formalised in a Ministerial Declaration and Indicative Action Plan to be followed by national and regional processes.

### 2.4.3. The Lacey Act

Another example of the many initiatives that have emerged to tackle illegal exploitation and logging in tropical forests is the 2008 amendment of the 1900 Lacey Act (USA, 2008, Sec. 8204), which marked an important step in the fight against illegal practices. This old American Act controls and penalises illegal trade in biological products (animal and plant products), and by incorporating tropical woods into the list of products covered by the Act, the 2008 amendment requires importers of wood products to justify the source of tropical woods marketed in the United States and the conditions of their extraction. With the adoption of this Act, the United States became the first country to lay down a legal framework prohibiting the import and trade of illegally sourced timber.

### 2.4.4. The FLEGT action plan

The action plan for Forest Law Enforcement, Governance and Trade (FLEGT) was drawn up in 2003 by the European Commission to support the actions carried out under the FLEG (German *et al.,* 2010). The main actions launched by the FLEG initiative focussed on strengthening governance regarding supplies from the timber-producing countries; the FLEGT also covers wood imports to Europe (German *et al.,* 2010).

One of the measures proposed by the FLEGT action plan was to support the setting up of Voluntary Partnership Agreements (VPAs) negotiated bilaterally between the EU and tropical timber-exporting countries. Under these agreements, timber-producing countries implement a timber chain of custody system and licences are issued attesting to the legal sourcing of EU timber imports. This means that the exporting countries are required to develop systems to verify the legality of the timber harvesting and processing. For its part, the EU undertakes to help set up or strengthen these systems, which are based on existing standards developed by various international initiatives: Origine et légalité des bois (OLB); Timber Legality and Traceability Verification (TLTV); Verification of Legal Origin (VLO); Verification of Legal Compliance (VLC); Legal Harvest Verification (LHV); Legality Verification System (LVS), etc. (PROFOREST, 2011). These may differ according to the national context. Initially designed to cover wood products such as raw logs, sawn timber, plywood and veneers, the FLEGT can also apply to other product ranges such as pulp or packaging materials, depending on the VPA negotiated.

So far, VPAs have been negotiated between the EU and several African exporting countries (Cameroon, Ghana, Congo, Liberia, Central African Republic), while others are currently being signed (Democratic Republic of the Congo, Gabon, Indonesia, Malaysia, Vietnam) or negotiated (Bolivia, Cambodia, Colombia, Côte d'Ivoire, Ecuador, Guatemala, Guyana, Honduras, Solomon Islands, Laos, Myanmar, Papua New Guinea, Peru, Sierra Leone and Thailand).

Besides promoting these voluntary mechanisms for verifying the legality of wood and timber products, the FLEGT also encourages more effective governance in the timber-producing countries, which could potentially lead to legal reform even in those countries that are not signatory to a VPA. It also supports initiatives to foster corporate social responsibility in private firms and promotes markets and trade between these firms, public administrations and civil society. Lastly, the EU has committed to reviewing its own economic and financial policy in order to combat practices such as concealment or money laundering, both of which play a large role in the import of illegal products. Moreover, the European Regulation on timber (EU, 2010) came into force in 2010 and will come in to force on 3 March 2013. It formally bans entry onto the European market of timber and wood products deriving from illegal practices and trade by regulating the VPA system and instituting the due diligence principle for European operators who place these products on the market for the first time. The due diligence system obliges timber companies to provide a reasonable and verifiable assurance that the products are legally sourced. This measure means that the FLEGT has a binding jurisdiction similar to the American Lacey Act.

SFM has thus gradually become institutionalised as a result of intensive legal and institutional activity that has advanced in successive phases in all of the forest basin countries. This activity is developed both in an international arena that has organised and worked constantly since the Rio Summit to produce the legislative frameworks and regulatory guidance, and in national arenas that are adapting their legislation and institutions with greater or lesser ease to the normative frameworks advocated by the international bodies. As the notion of SFM leaves a wide margin for interpretation, the prescribed normative frameworks are in flux and have changed considerably over the last twenty years. Although States still retain their sovereign rights over the public forest regime, they tend to delegate the effective management of forest resources to private entities. This delegation takes the form of new norms and management tools that are becoming increasingly standardised (management plans, economic instruments…) in a context of an expanding and more liberalised market for tropical timber, but which is in fact poorly controlled and in need of regulation.

We will now examine in greater detail the management arrangements that have evolved either in parallel or jointly with the legal and institutional advances, and how they are concretely implemented to ensure sustainable management of tropical forests.

# 3. Sustainable forest management: a panorama of the management arrangements in operation

It should be remembered that management sciences define a management arrangement (*dispositif de gestion*) as a broader concept than simply a management tool. A management arrangement specifies "what types of arrangements of men, things, rules and tools seem opportune at a given moment" (Moisdon, 1997, p.10). Management arrangements are thus assemblages of coordination rules (and thus interactions between actors) and management tools (and thus technical formalities) embodying a rationalising logic and a desire for organisational control. [38]

In recent years, the management arrangements promoted for the sustainable management of tropical forests have become more diversified and robust, driven mainly by the strong rule-setting activity described in the previous chapter. To study these arrangements, we drew on a corpus of over 2,000 references from the scientific literature, grey literature, university theses, lessons dispensed at the former National Rural and Forestry Engineering School (*École nationale du génie rural des eaux et des forêts* – ENGREF), which trains French forest engineers, and documents relating to project formulation and evaluation, as well as a series of interviews with actors from the forestry sector (*cf.* Appendices 3 and 5). The analysis of this corpus enabled us to separate out three broad types of management arrangements, each with its own priorities: those aimed at improving logging practices, those aimed at enhancing carbon storage and those aimed at deepening local communities' involvement and participation in the implementation of SFM (*cf.* Table 8). These will be covered in greater detail below.

[38] For a more detailed discussion of the French notion "*dispositif*", see Appendix 4.

Table 8 *The three main categories of arrangements for sustainably managing tropical forests*

| Improve forest exploitation | Enhance carbon storage | Widen the participation of local communities |
|---|---|---|
| • Sustainable forest planning<br>• Reduced impact logging<br>• Silvicultural intensification<br>• Forest certification (PC&I) | • Forestry CDM (Kyoto Protocol)<br>• REDD<br>• Voluntary market | • Joint Forest Management (JFM)<br>• Community Forest Management (CFM)<br>• Other forms of participatory management (Communal forests, etc.) |

*Source: the authors.*

## 3.1. Arrangements aimed at improving logging practices

Management arrangements that have commercial logging as their prime goal are those most often mentioned when reference is made to the sustainable management of tropical forests. The idea that "sustainable management has always been integrated into forestry" (Eba'a Atyi, 2001) is widely shared. Many, such as the FAO (1994a), consider that logging is crucial to a country's economic development and that the existence of a demand and market for timber represents a challenge to secure and maintain timber resources. In their view, supporting more responsible timber harvesting practices that take into account social and environmental stakes means applying the principle of SFM. Figures from the FAO (FAO & ITTO, 2011) on forest functions show that substantial areas of forest are dedicated to productive functions across the three tropical basins: 14% of total forest area in the Amazon Basin, 20% in the Congo Basin and 46% in Southeast Asia. Various arrangements have thus been widely developed for commercial purposes, mainly for the timber trade: sustainable forest planning, reduced impact logging and intensified silviculture, as well as the drive for forest management PC&I, which generally leads to forest certification.

### 3.1.1. *Sustainable forest planning*

#### What is it?

With the advent of the sustainable development concept in 1990s, the principle of not overexploiting wood resources, which was the initial idea behind forest planning (described in Part 1), was no longer deemed adequate. The need to integrate ecological and social forest functions into logging activities then emerged, mainly driven by the FAO (FAO, 1994*a*) and ITTO (ITTO, 1992*c*), and led to the introduction of the principle of sustainable forest planning (SFP). This new principle, like forest planning before it, nonetheless kept medium-to-long-term planning (around 30 years) of forestry production activities as its key component.

In addition to the prime objective of sustaining pre-SFM production levels, social and environmental concerns were also integrated, mainly introducing inventories of non-wood forest products (NWFP), large animal species and social issues.

The application of these different principles requires the definition of a legally compliant forest management plan (FMP) (as we underlined in Part 2; *cf.* Box 4) and the process for establishing this plan needs to coordinate the sometimes diverging interests of all the stakeholders (FORAFRI, 2002): "The analytical and reductionist forest planning characteristic of the technical domain of the past turns to participatory management and attempts to use a multidisciplinary and integrated approach, involving rural people, local communities" (Fargeot *et al.,* 2004). The FMP nonetheless basically relies on the "the mutual recognition of the silvicultural and industrial requirements" Fargeot *et al.,* 2004). During its implementation period, the FMP must be revised every five years so as to allow for a "continuous improvement process" (*Ministère de l'Ecologie et du Développement durable,* 2003).

From what was said in our interviews, this change in practices was perceived by some as "a revolution" (MAP interview) leading notably to the creation of a raft of new professions (*Office national des forêts International,* [ONFI], interview), whereas for others there has been no major change compared to former practices (WWF-Belgique interview).

## Box 4 *The principles underlying a sustainable forest management plan*

"Forest management is based on a multidisciplinary strategic analysis and complex technical syntheses calling on mapping, inventory-taking and modelling tools" (*Ministère de l'Écologie et du Développement durable,* 2003).

This box aims to give a layman's summary of the technical principles of forest management. It is largely based on the tropical forest management lessons that have been dispensed by the ENGREF for twenty years (Chevalier, 2005; Durrieu de Madron, 2008), on scientific and technical publications (Durrieu de Madron & Forni, 1997; Dutrève e*t al.,* 2001; ATIBT, 2005*a*; ATIBT, 2005*b*; ATIBT, 2007) and on an analysis of the contents of several management plans carried out in tropical Africa. The model described here is implemented in the Congo Basin and supported by France.

**Collection of baseline data**

Before choosing and planning the actions to be implemented during the management period, the extent of the forestland area to be managed needs to be defined; knowledge on the environment concerned must be collected; and the expectations of both the industrial logger and the local populations need to be defined. This requires different steps:

- collecting bibliographic data on the physical environment (topography, climate…);
- establishing a forest management inventory: this is the core component of the study prior to the drafting of the management plan. Its main purpose is to identify the available wood resource in order to plan its harvesting. On the basis of aerial photo interpretation, a stratification of the forestland is carried out (*i.e.* a division into homogenous areas of the main types of forest stands). A pre-inventory allows the coefficient of variation to be computed (stand heterogeneity) for each stratum. This is needed to calculate the sampling rate (number and size of plots to be inventoried) and so as not to exceed a set sampling error margin. The inventory process itself is a relatively heavy field operation that involves surveying and measuring the number of trees and counting the regeneration of potentially harvestable woody species, following the sampling design. These data readings are completed by surveys on the presence of large fauna, generally carried out using indirect observation (faecal residue and tracks), and on species that provide non-wood forest products (NWFPs). The collected data are analysed to estimate the timber volume (using volume tables), its spatial distribution and diameter structure (distribution of tree population by diameter class), which provides information on the stand-level dynamics;

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- making a socio-economic diagnosis, which makes it possible to "distinguish the characteristics, living conditions and activities of the local populations, the sources of conflict and potential obstacles, the characterisation of use rights" (ATIBT, 2007). However, in most management plans, the methodology for the socio-economic diagnosis is much less explicit than for the forest management inventory.

**Formulating the management plan**

Using the collected data, the management plan sets the production targets as well as the environmental and social objectives. On the basis of these, the forest development unit (FDU) is divided into a series designated for production, conservation and protection, and a series designated for agriculture and/or agroforestry. To exploit the production series, first, the species to be harvested are selected and then a minimum exploitable diameter (MED) for managed stands is set for each tree species according to the selected felling cycle (*i.e.* the interval, generally 25-40 years, between two fellings of the same species) and to the regeneration rate (calculated for each species in function of its growth, mortality rate and diameter structure) in order to ensure recovery of exploited stock over the cycle. The MED is above or equal to the minimum cutting diameter (MCD), the latter generally being set by regulation. Logging operations are then planned in time and space by dividing the area into forest management units (FMUs) so as to balance harvesting activities over the entire management period. The management plan also stipulates the logging methods to be used, generally based on reduced-impact logging (RIL) techniques, and possible silvicultural interventions (thinning, plantations, intensification, etc.).

**Implementing and reviewing the management plan**

Implementation of the management plan is defined by regulation in the national jurisdictions of tropical countries. The logging company may be required to establish management plans for each FMU based on a pre-exploitation inventory and an annual operations plan. Regulations also determine the frequency for reviewing these plans, which makes it possible to compare the actual tree population after harvesting with the management forecasts, to assess the state of the environment (which often involves simply a faunistic and social inventory), and to put in place corrective measures to reduce the gap between the initial objective and actual results.

## Geography

SFP has been widely promoted by France, chiefly in the Congo Basin (*Ministère de l'Ecologie et du Développement durable,* 2003; *Ministère des Affaires étrangères,* 2004; Guéneau, 2006). Based on the work carried out by the Tropical Forest Technical Centre (Centre technique forestier tropical – CTFT)[39] and the Centre for International Cooperation in Agronomic Research for Development (*Centre de coopération internationale en recherche agronomique pour le développement* – CIRAD), the French Ministry for Foreign and European Affairs (MAEE) supported a research programme between 1996 and 2002 that aimed to "obtain for forestry sector actors the reliable scientific and technical knowledge that they need" in order to "contribute to the sustainable management of Central and West African dense forests"[40] (Doumenge *et al.,* 2003). The latter took a special interest in the FMP (FORAFRI, 2002; *cf.* Box 5). In addition, the AFD and the French Global Environment Facility (FFEM) have been providing finance to support these management plans in the Congo Basin since the 1990s (*Ministère de l'Écologie et du Développement durable*, 2003). A recent study on the capitalisation of AFD's interventions in the Congo Basin over the last twenty years[41] reports that a little over 20 million euros were disbursed to promote the FMP (Samyn *et al.,* 2011) from 1990 to 2010.[42] Out of a total 30.1 million euros granted by the FFEM to thirteen biodiversity projects in the Congo Basin since 1998, 5 million euros of grants have gone to FMP-related projects (*i.e.* nearly 17%; *cf.* Lauginie *et al.,* 2011).

This dynamic for forest planning is seen as being highly specific to the Congo Basin. Some actors even consider that it would be difficult to export the dynamic to Latin America and Asia (ONFI interview). The "French school", which is grounded on the

[39] The *Centre Technique Forestier Tropical* (CTFT) was set up in 1950 at the initiative of those in charge of the French colonial forest mission, notably the Ministries of the Colonies and of the French Overseas Territories. Since its inception, it has carried out reseatch on forests and woodlands in the intertropical regions, in the territories and deparments of Overseas France and the former African colonies, as well as on fisheries and fish-farming in tropical inland waters. Towards the end of the 1950s, when the former French colonies attained independence, the CTFT was tasked under various cooperation agreements with conducting forestry research in these newly formed countries. In 1984 the *Centre International en Recherche Agronomique pour le Développement* (CIRAD) was created from the merger of nine public research institutes, one of which was the CTFT.

[40] Translator's translation.

[41] Document downloadable on the AFD site: http://www.afd.fr/webdav/site/afd/shared/PUBLICATIONS/RECHERCHE/Evaluations/Evaluations-conjointes/EvaluationCongo_GB.pdf.

[42] We should point out here that some actors challenge this deep involvement of France and its donors in promoting the FMP, as they see little reason for funding a regulatory obligation (MAP interview). In fact, a recurring debate on development assistance issues is whether or not law enforcement in developing countries should be financially supported and promoted. The answers to this question are not consensual.

multi-functionality of a single concession, would be at odds, for example, with the siloing of functions advocated in the geographies under Anglo-Saxon influence (ONFI and MAP interviews).

Looking at the FAO figures (*cf.* Table 9 and Map 3), the forest areas covered by a forest management plan clearly extend far beyond the zone under French influence, which explains why the existence of a specific "French school" is contested by some (CIFOR interview). The FMP model promoted by France is nonetheless relatively specific notably in that it introduces longer felling cycles (CIFOR interview). Moreover, as was seen earlier, the laws and regulations pertaining to the principles and requirements for sustainable forest planning are generally more precise and more stringent than those in Southeast Asia, particularly as the MED is defined for each tree species and not for commercial species as a whole (as is the case in Indonesia, for instance; *cf.* Sist, 2000*a*). Technical recommendations also vary across regions: harvested volumes are larger in Southeast Asia and the methods for calculating regeneration rates are different compared to Brazil (Durrieu de Madron, 2008). These particularities of French-style sustainable forest planning in the Congo Basin could be explained by the fact that there is less available marketable timber for an equivalent forest area in this region, [43] which thus implies the need for a more cautious management approach. Whatever the case, the FAO figures on forest areas under management hide considerable differences in practice.

[43] Notably owing to the way in which the industry is structured and to transport costs, which increase rapidly in the Congo Basin in function of the distance between a logging site and a port (AFD interview).

## Box 5 *The FORAFRI project: and French scientific and technical tool in the Congo Basin*

The FORAFRI project, which operated from 1996 to 2002, involved a group of Central and West Africa French-speaking countries. This applied research project aimed to "obtain for forestry sector actors the reliable scientific and technical knowledge that they need" in order to "contribute to the sustainable management of Central and West African dense forests" (Doumenge *et al.,* 2003). It received funding from the French Ministry for Foreign Affaires and was implemented by CIRAD's Forest department and CIFOR. The project successfully capitalised on the studies conducted over several decades by the CTFT and CIRAD, some of which had been completed before the appearance of the concept of sustainable tropical forest management (as is pointed out by many forewords in documents produced during the project). The project also benefited from scientific and technical partnerships with leading scientific, professional and educational networks in the sub-Saharan African forestry sector.

The scope of the project meant that it became a scientific and technical tool that extended France's sustainable development policy to countries south of its historical zone of influence.

As a result, the project understandably helped to promote sustainable forest planning, France's flagship SFM tool, within the Congo Basin. The project activities thus targeted the acquisition and transfer of the knowledge necessary to this management method. Research into the ecological bases of production forest management (Doumenge *et al.,* 2003) conducted within several experimental forestry schemes (Durrieu de Madron *et al.,* 1998*a* and *b*; Favrichon *et al.,* 1998), and the use of modelling techniques (Doumenge *et al.,* 2003) aimed to give a better understanding of the dynamics of forest stands so as to adjust felling parameters (DEM, felling cycle length, thinning) and introduce logging practices that would not compromise regeneration, and thus future extraction.

Using the findings of these studies, the project promoted forestry techniques based on intensified silvicultural actions mainly on economically valuable woody species (Dupuy, 1998), but also sometimes on NWFPs (Tchatat *et al.*, 1999). It also supported practices, particularly RIL techniques, which mitigate the impacts of logging. Training in the use of mapping technology was also prioritised (Freycon & Fauvet, 1998; Freycon & Yandji, 1998; Pain-Orcet *et al.,* 1998) to allow more efficient and more precise planning of logging activities using Geographic Information Systems (GISs). Finally, the project supported the idea that forest management needed to take all actors into account (Nguinguiri, 1998; Pénelon *et al.,* 1998) and thus advocated the development of participatory approaches (Delorme, 1998; Nguinguiri, 1998).

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In terms of environmental assessment, the research carried out within the various experimental schemes evaluated the impacts of silvicultural activities and logging often over a period of twenty years or so. In most cases, the criteria used to evaluate impacts were designed to guarantee the sustainability of logging activities by ensuring the regeneration of the resource, chiefly commercial woody species (demographic indices for logged woody species; *cf.* Dupuy, 1998; Durrieu de Madron e*t al.,* 1998*a* and *b*; Favrichon *et al.,* 1998) but also NWFPs in view of their "socio-economic interest and maintenance of the major ecosystem functions" (Tchatat *et al.,* 1999).

Finally, FORAFRI co-edited a series of manuals on criteria and indicators for "anyone wishing to assess the viability of a given forest managed – at least partly – for timber production" (CIFOR, 2000*a,* p.7). These documents support the idea that a PC&I system must be adapted to local contexts and propose a "starting platform" (CIFOR, 2000*a,* p.17) and a set of methodology guides on how to carry out this adaptation (Mendoza & Macoun, 2000; Prabhu *et al.,* 2000). Many of these guides lay emphasis on "human well-being" criteria (CIFOR, 2000*b* and *c*; Colfer, 2000; Salim & Colfer, 2000). In this PC&I system designed as a "starting platform", three strands are considered: political, social and ecological aspects. The ecological aspect is treated in detail and based on parameters of ecosystem integrity including *(i)* the biodiversity of habitats, communities, groups of targeted species such as birds, large butterflies or NWFPs, and physical and chemical parameters, *(ii)* ecosystem functions and *(iii)* the preservation of genetic variation.

An overview of FOARFRI's work in terms of the three sustainable development pillars shows that the economic pillar receives most attention, with the underlying management doctrine being that of timber exploitation (planning, silviculture). The social strand is addressed through the inclusion of local community interests (NWFPs) and the need to consider all actors. The main aim of environmental strand is to maintain commercially valuable forest species, which of course can be seen above all as an economic interest – apart from CIFOR's PC&I system, which is more demanding on this count (Prabhu *et al., ibid.*).

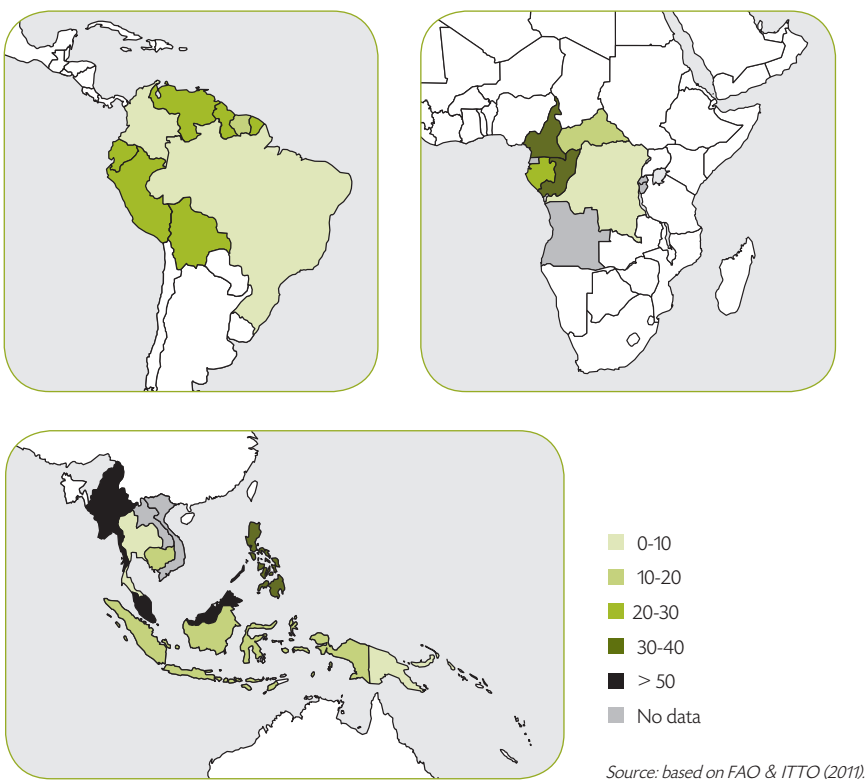
*Source: the authors.*

## Table 9 *Area of forest with a management plan in the three rainforest basins, 2010*

| Region | Area of forest with a management plan (1,000 ha) | (% of total forest area) |
|---|---|---|
| Amazon Basin | 75,496 | 9 |
| Congo Basin | 30,820 | 10 |
| Southeast Asia | 59,666 | 28 |
| Rainforest basins, total | 165,982 | 13 |

*Source: based on FAO & ITTO (2011).*

## Map 3 *Proportion of forest area with a management plan by country, 2010.*




*Source: based on FAO & ITTO (2011).*

## 3.1.2. *Reduced-impact logging*

### What is it?

Reduced Impact Logging (RIL) appeared in the early 1990s concurrently with the concept of SFM. Some authors consider that it is impossible to give RIL a standard definition since the procedures involved need to be tailored to each specific region (Ezzine de Blas & Ruiz Pérez, 2008). We can nonetheless refer to the definition given in the FAO's *Forest Harvesting and Engineering Working Paper No.1* (2004*b*), according to which RIL represents "intensively planned and carefully controlled harvesting operations to minimise the impact on forest stands and soils". A few years later, Putz *et al.* (2008, p. 1428) defined it in similar terms as "intensively planned and carefully controlled timber harvesting conducted by trained workers in ways that minimize the deleterious impacts of logging".

The RIL management system is based on a set of technical recommendations involving planning, optimisation of different logging activities and reduction of environmental impact (*cf.* Box 6).

### Box 6 *RIL principles and techniques*

The technical content and quotes in this box are sourced from studies published in *Bois et forêts des tropiques* (Sist, 2000*b*).

RIL establishes technical recommendations for both the pre-harvesting phase and the actual felling. These techniques are implemented on a finer scale than that of forest management, both in terms of time (about one year) and space (the area designated for felling). The prime goal of RIL is to limit impacts on the environment during harvesting operations, but it should also help to optimise activities in order to increase profitability and reduce work-related accidents. The implementation of these techniques implies a "specific organisation of the logging company's personnel" and "technical training at all levels, from the logger to the forestry engineer".[44]

**Pre-harvesting operations**

The purpose of these operations is to "draw up an inventory of the timber resources", "efficiently plan logging operations (road network, skid trails, trees for removal) and prepare an operations map":

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[44] All quotes from Sist (2000*b*) cited in Box 6 are translated by the translator.

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- an inventory of timber resources in the area to be logged within the year: this involves a smaller area and shorter harvesting period than provided for by the forest management inventory; it is rather a logging inventory at the FMU level;
- climber-cutting: this operation should be carried out at least one year before felling to prevent a falling tree from bringing down other trees connected to it by epiphytes;
- definition of the areas to be protected, where no felling will be carried out: this concerns "areas that are inaccessible due to steep slopes… or hydromorphic conditions", "sacred areas", "conservation areas", "areas that are fragile or unique or also have a high level of biodiversity" and "buffer zones along water courses";
- "planning of roads, timber yards and skid trails": to limit the areas impacted by these infrastructures, reduce environmental impacts (forest cover, soil erosion, sedimentation in rivers) and optimise the network; this operation uses GIS mapping;
- opening up of skid trails ahead of felling: to make work easier for the loggers and enable them to optimise their selection of trees.

**Harvesting operations**

- Directional felling "to facilitate log extraction" and limit impacts on regeneration and damage to saplings. This means that forestry personnel need to be trained in these felling techniques and requires "greater attention and time from the logger";
- skidding: particular attention required when crossing watercourses to limit impact on soils.

## Geography

RIL techniques seem to have developed first in Asia, then in the Amazon and subsequently in West and Central Africa. Yet, in the literature on forestry in the Tropics, SFM and RIL are frequently confused (Putz *et al.,* 2008), which may explain why it provides very little detail on the geographies where RIL is implemented.

Interestingly, our analysis of legal texts in the Tropics shows that some countries explicitly cite RIL in their recommendations on sustainable forest management. This is the case of the Republic of Congo (République du Congo, 2009), the Democratic Republic of the Congo (République démocratique du Congo, 2006), the Republic of Cameroon (République du Cameroun, 2001) and the Republic of Ghana (1998).

### Sustainable forest planning and RIL: how do they differ?

Are RIL and sustainable forest planning two different practices? Niesten and Rice (2004) consider that RIL has "a less ambitious objective [than sustainable forest planning] of simply reducing the physical impact of logging, without focussing on the long-term supply of wood". For Karsenty and Nasi (2004), the difference between RIL and forest planning does not hang on the practices but on the type of regulation associated with each. In the main, forest planning amounts to a regulatory obligation whereas RIL is more of a voluntary commitment. For them and for other authors (Sist, 2000*b*; FORAFRI, 2002; Ezzine de Blas & Ruiz Pérez, 2008), RIL practices are part of the logging practices implemented under sustainable planning regimes. However, RIL also includes a planning phase for logging activities and would thus appear to partly overlap with forest planning, and possibly stand as its equivalent.

In any case, what seems to mark a distinction between sustainable forest planning and RIL is not only the "schools" that have supported them (Anglo-Saxon for RIL and French for forest planning), and consequently the geographies in which these practices have been widely implemented (Asia and the Amazon for RIL, Africa for forest planning), but also their prime goal: the sole purpose of RIL is to limit the eventual environmental impacts of one-off logging operations, whereas forest planning integrates this goal into a broader and longer-term planning for timber production.

## 3.1.3. *Silvicultural intensification*

While sustainable forest planning and RIL are the most extensively used forms of management, other proposals have been put forward in recent years; one notable example is silvicultural intensification (Fredericksen & Putz, 2003). This approach has been developed to enhance the sustainability of timber production by offering a better response to the issue of regenerating the wood capital between two fellings. In line with this approach, some authors recommend lengthening felling cycles and/or more intensive silvicultural interventions to foster the regeneration and growth of commercially valuable species (Fredericksen & Putz, 2003.). Studies on the effect of different silvicultural treatments on forest stands have been carried out (Pena-Claros *et al.,* 2008). However, this management approach is still relatively rare in the SFM-related literature.

### 3.1.4. *PC&I for sustainable forest management and forest certification initiatives*

Following the Rio Summit and in response to the environmental and social issues foregrounded in the late 1980s, various international actors set about developing a PC&I system along with an ecocertification process so as to gain rapid and effective control of logging practices from an environmental and social point of view (Smouts, 2001). As a result, SFM and certification are now often seen as going hand in hand (Rametsteiner & Simula, 2003). "To move towards something more sustainable, we try to push our clients to adopt the best management and production methods for their tree species and particularly to become as certified as possible (Proparco [45]). For many actors, these tools now represent an ideal system for implementing SFM.

#### Emergence of PC&I and certification

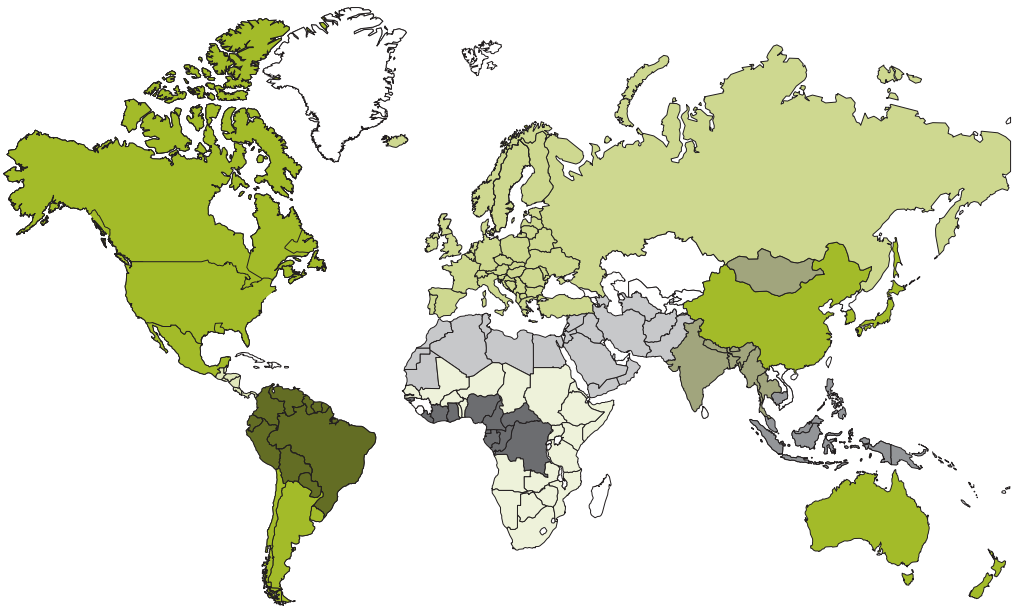
##### *International initiatives to define PC&I for sustainable forest management*

ITTO was the first organisation to support this approach by defining "the criteria for the measurement of sustainable tropical forest management" (ITTO, 1992*b*, p.1) in order to "encourage the development of national policies aimed at sustainable utilization and conservation of tropical forests and their genetic resources, and at maintaining the ecological balance in the regions concerned" (ITTO, 1992*a*, p.1). These C&I, designed as new normative decision tools for forest-related policy that were to establish and monitor the Rio Forestry Principles (United Nations, 1992*b*), were thereafter revised in 1998 (ITTO, 1998).

Many other international initiatives followed on and led to the creation of nine international processes dealing with C&I systems between 1992 and 1999. Five of these processes related to tropical forests and involved over 150 countries working with the FAO and other forestry actors (including ITTO) (FAO, 2001c): the African Timber Organisation (ATO), the Dry Forests in Asia process, the Dry Zone Africa process, the ITTO process, the Lepaterique process for Central America, the Montreal process, the Near East process, the pan-European Cooperation process and the Tarapoto Proposal for sustainable management of the Amazon forest (*cf.* Map 4).

[45] Subsidiary of the AFD Group, with the mandate of financing the private sector: http://www.proparco.fr/Accueil_PROPARCO

## Map 4 *International processes establishing regional criteria and indicators for sustainable forest management*




*Source: based on FAO (2011).*

### *Initiatives by civil society and the forestry sector*

Alongside these international initiatives, there were other more independent moves to reinforce the ecocertification system begun in the 1980s (*cf.* Part 1). One example is the pioneering Smart Wood certification programme launched in 1990 by the NGO Rainforest Alliance, which was designed to identify wood products sourced from properly managed forests (Tsayem Demaze, 2008). Other examples include the Tropenwald (Initiative Tropenwald, 1993) initiative set up by importers and wood workers unions in Germany, and the Woodmark Scheme piloted by the British Soil Association (1994). These instruments back the idea that by economically enhancing the value of sustainable management practices, certification can help to prevent the

forests in question being deforested for more lucrative activities. The PC&I systems developed or adopted to manage this certification have continued to multiply and currently a number of different certification systems exist. Two standards however have taken the lead: the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification schemes (PEFC), and we will return to these below.

### *Discussions in the scientific community*

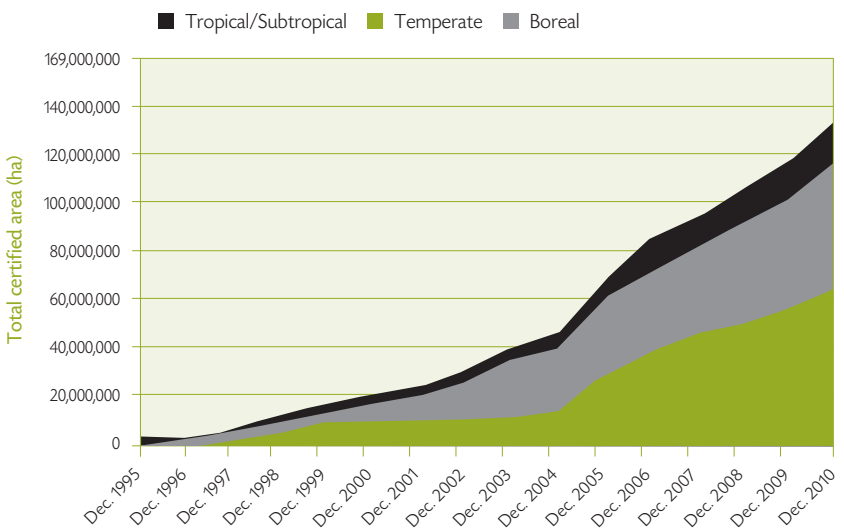
The scientific community has also been involved in these different initiatives. The CIFOR produced a list of generic C&I in 1999 (CIFOR, 1999). Here, the term "generic" is used to highlight the fact that the C&I can be "modified and customised to comply with local conditions" (CIFOR, 2000*a*, p.15) and also that they address a wide range of actors (certification bodies, IGOs, donors, forest managers, project managers and scientists). These C&I have extended the certification process to different types of forest area such as commercial forest plantations, protected areas and community-managed forests (CIFOR, 2000*a*). C&I lists have also been produced by members of the scientific community, who were less concerned with supporting the certification process than responding to the challenges of evaluating forest management arrangements (Karsenty *et al.,* 2004). These works have produced C&I for different types of forests under management: community forests (Balana *et al.,* 2010; Chattopadhyay & Datta, 2010), conservation forests (Brand, 1997; Gomontean *et al.,* 2008) and plantations (Stupak *et al.,* 2011).

### *The FSC: an approach initiated by environmental NGOs*

Created in 1993 at the initiative of large international NGOs (WWF, Friends of the Earth, Greenpeace, Rainforest Alliance, etc.), the FSC is presented as one of the main initiatives supporting a sustainable management approach that is "economically viable", "socially beneficial" and "environmentally appropriate" (FSC, 2011*b*). Today, it groups together 800 organisations worldwide holding a variety of statuses (NGOs, industrial and trade representatives from the forestry sector, local associations and civil society representatives). The FSC has established a set of PC&I defining international and regional standards for the evaluation and certification of forest production practices. It proposes two certification mechanisms: *(i)* Forest Management (FM), which involves inspecting and accrediting forest management practices, taking into account management-related, economic, social and environmental aspects; and *(ii)* Chain of Custody (CoC), which involves inspecting and accrediting the entire production and marketing chain for products from managed forests. The activities certified through either of these processes receive a label (FM or/and CoC) in the form of a logo, giving brand recognition to the products sold.

At the end of 2011, CoC certification involved 107 countries with 21,535 certificates issued worldwide (FSC, 2011a). FM certificates totalled 1,065 across 79 countries, taking total certified forest area to some 145 million ha, including 16 million ha of tropical forest (FSC, 2011a.). FM-certified forest thus represents about 3.5% of the world's total forest area (about 4 billion ha) (FAO, 2011). Since the creation of FSC in 1993, forest areas covered by FSC certification have been increasing steadily (*cf.* Graph 7).

**Graph 7** *Growth of FSC-certified forest area worldwide from 1995 to 2010.*




*Source: based on FSC (2011a).*

The FSC's institutional and decision-making structure was designed so as integrate the three pillars of sustainable development. It comprises three tiers of governance, whose decision-making powers decrease from top to bottom.

1. The General Assembly is the most important level encompassing all FSC members, who are grouped into three chambers:

- an economic chamber (composed of companies and individuals from the forestry sector, certification bodies, consultants, distributors...
- a social chamber (NGOs defending local communities' rights, trades unions, research institutes...)
- an environmental chamber (environmental NGOs, researchers...).

Decisions are taken equitably, as each chamber has the same voting power in order to maintain a balance between the actors of the three sustainable development pillars. Moreover, in each chamber half of the votes are given to members from Southern (developing) countries (Mechel *et al.,* 2006).

2. The Board of Directors, composed of nine elected members (three from each chamber)
3. The President

This structure is replicated at the international and national levels. The chamber system exists therefore in each country where an FSC certification system has been set up.

The FSC calls on third-party certifying and auditing bodies,[46] all of which are accredited by Accreditation Services International (ASI) and tasked with assessing compliance with the FSC PC&I. The ASI assesses the certification bodies and organises the audits, and then reports back to the FSC, which means that the FSC does not directly intervene in the evaluation of SFM practices.

### *The PEFC: a response from the forestry industry*

Given the expansion of FSC, European producers from the private sector recognised the usefulness of forest certification schemes but were also aware of the threat of certification being driven by NGOs rather than the industry itself. In response, they pooled their efforts to create the Pan-European Forest Certification (PEFC) scheme, which changed its name in 2003 to become the Programme for the Endorsement of Forest Certification (PEFC). The PEFC took as its framework the principles of

[46] The list of accredited certification bodies for the FSC is available on the ASI site, http://www.accreditation-services.com/ (ASI, 2011).

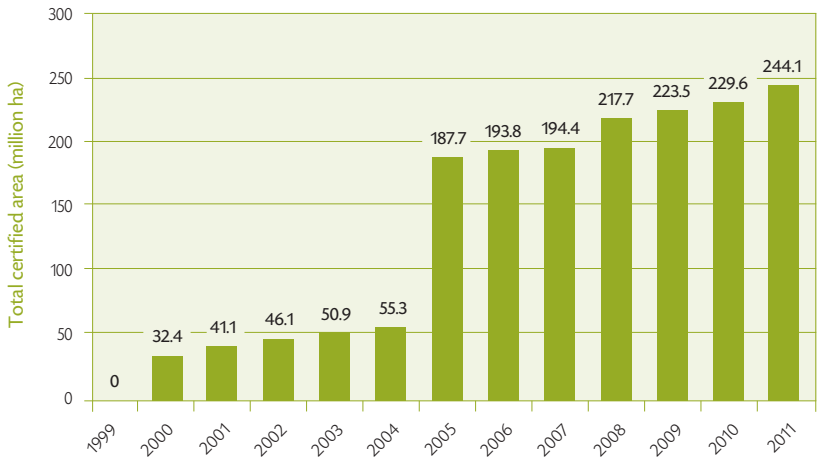
sustainable management promoted by Rio and the work of the Helsinki Ministerial Conference (Ministerial Conference on the Protection of Forests in Europe, 1993). Realising that the FSC was poorly or not sufficiently adapted to small forest areas or small forest holdings, too costly and of limited geographical coverage, PEFC initially developed with the objective of producing standards for SFM certification within the pan-European area. The PEFC proposes to forest owners membership of national and regional bodies governing the forestry sector, which enables huge zones to be certified *en bloc* and avoids the need for individual certification by a specialist company (Buttoud & Karsenty, 2001).

In 1999, the PEFC established a list of PC&I for management practices applicable to all types of forest. This is based on the six criteria defined at the Helsinki Ministerial Conference, the overarching goal being "the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems" (Ministerial Conference on the Protection of Forests in Europe, 1993, p.1).

In 2000, the PEFC endorsed the first national certification schemes for Germany, Austria, Finland, Norway and Sweden. The change of name in 2003 removed its exclusively European scope and, in 2004, the first national certification schemes outside of Europe, namely Australia and Chile, integrated the PEFC system. Thereafter, other countries followed the tide, one of the largest being Canada, which adopted the PEFC in 2005 and is now the country with the largest certified forest area in the world, with over 100 million ha.

Like the FSC, the PEFC now has two certification tools, FM and CoC, and is today the world leader in forest certification. In 2011, it had issued 8,585 CoC certificates across 57 countries. It has also led to the certification of some 244 million ha of forest (nearly half of which are in Canada), involving almost 520,000 forest owners in 29 countries, including some 6 million ha of tropical forest located in Brazil and Malaysia (PEFC, 2011). Interestingly, unlike FSC coverage, the international scope of PEFC mainly extends to temperate forests. FM-certified forests under PEFC represent around 6% of the world's total forest area (FAO, 2011), which is almost twice the area covered by the FSC. Like the FSC, the PEFC process has continued to expand since its creation in 1999 (*cf.* Graph 8), bolstered in particular by the adhesion of the large forest countries such as Australia, Canada and Chile.

Graph 8 *Growth of PEFC-certified forest area worldwide from 1999 to 2011*




*Source: based on PEFC (2011).*

The PEFC Council, like the FSC, is a non-governmental, non-profit organisation.

PEFC International comprises three levels of decision-making bodies:

1. the General Assembly which is the PEFC's highest authority. It is made up of national members (States) and international organisations,
2. the Board of Directors, responsible for putting in place the policy voted by the General Assembly at international level,
3. the General Secretariat.

It steers the organisation's orientations, which are then adjusted to each country context.

At a national level, the PEFC comprises the same three decision-making authorities, with a General Assembly organised into three colleges:

1. the college of forest producers and landowners that manage public and private timber-producing forests;
2. the college of processors of forest produce;
3. the college of forest users (which groups representatives of civil society and NGOs. In France, it includes farmers, hunters, the association *Amis de la forêt* and France Nature Environnement [FNE], which is a national federation of NGOs).

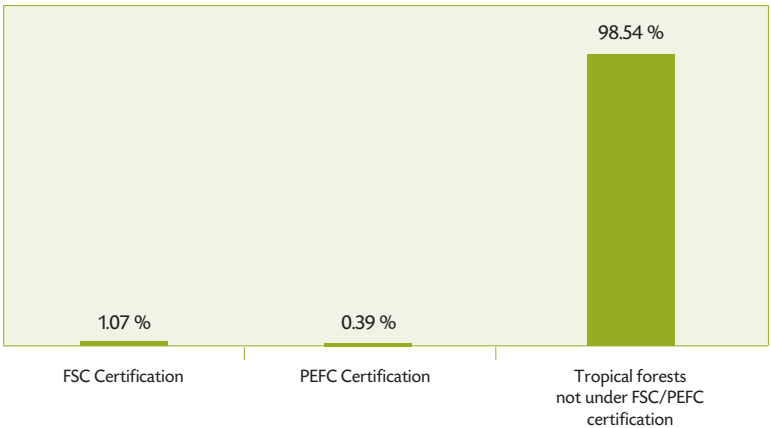
The Assembly takes an active part in decision-making and revising the PC&I. It publishes and adopts master certification schemes that then become valid nationwide. Once these schemes have been adopted by a State, a forestry operator can request certification from the PEFC, which then awards a certificate at regional level on the basis of a commitment to continuous management improvement with respect to overall objectives, rather than a commitment by each forest owner to individual objectives (as is the case for FSC). Furthermore, PEFC sets no specific target to be reached and no initial audit or regular auditing is required for membership. Instead, random audits are carried out on a sample of members in the region concerned. Certification is carried out by third-party certifiers accredited by the International Accreditation Forum (IAF) and the International Organization for Standardization (ISO).

It should be noted that this certification system is dominated by forest landowners and industrialists mostly from Europe (Cashore *et al.*, 2004). They were not only at the origin of the certification process, but an analysis of their governance structure shows that the economic interest group made up of the forest landowner and producer colleges holds two thirds of the votes, which means that the college of forest users has a structural minority in any decision-making (Hanff *et al.,* 2007).

### *Certified tropical forest areas: still mixed results*

For tropical forest certification, a huge effort is still needed. In fact, although the FSC covers just over 16 million ha of tropical forests (FSC, 2011a), which is three times more that PEFC-certified tropical forests (just under 6 million ha; PEFC, 2011), 98.5% of tropical forest (*i.e.* 2 billion ha) have not been certified by either of these leading standards (*cf.* Graph 9). Several reasons have been advanced to explain this absence of certification in tropical forests: the fact that developing countries may perceive certification as an attempt by industrialised countries to interfere in their environmental affairs, or the fact that most of the forests in developing countries are publicly owned may hinder voluntary initiatives (Tsayem Demaze, 2008).

Graph 9 *Share of FSC and PEFC certification in the intertropical zone in 2011*




Results based on the 56 tropical countries identified earlier (excluding China and French Guiana).

*Source: the authors.*

## *Competing labels*

Forest certification is marked by lively and persistent competition between the different systems (Ghazali & Simula, 1996; Buttoud, 2001*a*; McIntyre, 2001; Holvoet & Muys, 2004; Auld *et al.*, 2008). The first to oppose the FSC criticised its market monopoly and soon fuelled this rivalry by defending other systems considered more appropriate (Arnould, 1999). The first contender was the ISO 9000 standard introduced in 1987, before the FSC, and then modified in 1994, 2000 and 2008, certifying the quality of environmental management procedures. The biggest contender, however, was PEFC, which aimed to provide a pragmatic response to the problems of small forest areas and smallholders in Europe (Buttoud & Karsenty, 2001; Guéneau, 2009).

Since then, a veritable war of labels has broken out in the international arena (Buttoud & Karsenty, 2001; Ollivier, 2001; Buttoud, 2004; Holvoet & Muys, 2004; Greenpeace, 2008; McDermott *et al.*, 2008; Guéneau, 2009; Mione *et al.*, 2009). Without entering into detail, in Table 10 we list the main differences between the two certification systems that are now most widespread: the FSC and the PEFC.

## Table 10 *Main differences between the FSC and PEFC certification systems*

| | FSC | PEFC |
|---|---|---|
| Origin (created by) | Environmental NGOs and retailers (DIY and tools) (1993) | European forest landowners and timber industry associations (1999) |
| Governance | Top-down approach and top-down certification: FSC national schemes accredited by FSC International | Bottom-up accreditation approach and "umbrella" certification: PEFC Council represents national schemes |
| Decision-making | Participatory: 3 chambers (economic, social, environmental), each chamber having 33% voting rights | Flexible: voting on national schemes depends on annual wood production. 3 colleges (forest producers and landowners managing forests, industrial processors, users). |
| Types of standards | Performance-based: results | Procedure-based: continuous improvement |
| Principles and criteria | (10): Biodiversity, indigenous peoples, constraints on plantations, no genetically modified organisms (GMOs) | (6): No constraints on plantations or GMOs, state-defined forest management criteria |
| Verification procedures | Individual certification: initial audit / strict annual audit / public reporting / obligation to ensure compliance | Regional certification: Random annual auditing, no initial audit or public reporting |
| Accreditation process | FSC system + ISO 65 | ISO system (Forest sector guides) |
| With third-party bodies | International ASI accreditation | National accreditation through IAF |

*Sources: based on Leroy & Mione (2011), Tozzi* et al. *(2011) and Hanff* et al. *(2007).*

As the world's areas of non-certified, mainly tropical forest are still vast, they constitute a strategic market for each of the leading certification organisations. Competition between the FSC and the PEFC still exists today.

We will now address a second important category of management arrangements operating under the SFM banner: the mechanisms designed to improve carbon storage.

## 3.2. Arrangements aimed at enhancing carbon storage

Management arrangements aimed at storing carbon are widely covered in the grey literature and scientific literature on SFM. As these mechanisms also constituted a central theme in many of our interviews, it is interesting to trace how this SFM doctrine has emerged. To do so, we first revisit the carbon markets and the integration of forest-related topics into climate negotiations. We then examine in greater detail the three forest-related carbon finance mechanisms that are promoted as pro-SFM instruments: the forest Clean Development Mechanism (CDM), forest financing on the voluntary market and the mechanism for Reducing Emissions from Deforestation and Forest Degradation (REDD+).

### 3.2.1. *The emergence of the carbon compliance market and voluntary markets*

The hypothesis that the climate changes observed over recent decades are human-induced has become increasingly compelling in light of the series of reports published by the Intergovernmental Panel on Climate Change (IPCC), to the point that today it is backed by the vast majority of the scientific community (Anderegg *et al.,* 2010). The need to respond to this global environmental threat has led the international community to gradually engage, starting in 1992, in a process to reduce greenhouse gas (GHG) emissions, which are seen as driving factor behind these climate changes. The United Nations thus set up the UNFCCC, ratified by 155 countries. Since it came into force in 1994, the signatories convene annually at the COP to examine how the Convention is being applied and to make the necessary decisions to promote its effective implementation. In 1997, at the COP3 in Kyoto, the industrialised countries (listed in Annex B of the Kyoto Protocol), undertook a binding commitment to reduce their emissions over the period 2008–2012, by an average 5.2% compared to the 1990 baseline levels. The Kyoto Protocol adopted at COP3 thus lays down the accounting rules and eligible mechanisms. It entered into force in 2005, when the requirements relating to its ratification were met. [47]

[47] For the Protocol to come into force, the signatures of at least 55% of the Parties accounting for at least 55% of GHG emissions in the Annex B countries were required.

In tandem with this drive towards binding commitments by States and which only targeted industrialised countries, many private voluntary initiatives were set up, even though their emissions reductions were not counted as contributions to the targets set by the Kyoto Protocol.[48]

The systems put in place by the Kyoto Protocol, like the voluntary systems, are based on the notion that carbon sequestration and GHG emissions reduction are positive externalities that should be compensated. This rationale underpins the carbon finance mechanisms developed over the past ten years, whereby carbon credits, expressed in tonnes of carbon dioxide equivalent ($tCO_2e$) either sequestered or not emitted, can be traded on both the compliance market (with carbon credits contributing to the Kyoto Protocol targets) and on the voluntary market (which functions outside of the Kyoto Protocol).

### 3.2.2. *Gradual incorporation of forest-related questions into climate negotiations*

The role of forests in carbon sequestration is exceptionally important: forest ecosystems account for 80% of terrestrial carbon stored in biomass and 40% of carbon stored in soil (Seymour & Forwand, 2010). On this count, the extent and high productivity of tropical forests are particularly important. Pan *et al.* (2011) estimate that between 47.5 et 62.5% of forest carbon stocks (soil and biomass) are located in tropical regions. Moreover, based on recent estimates (Friedlingstein *et al.,* 2010; Peters *et al.,* 2011), deforestation may be responsible for from 11 to 15% of the global GHG emissions,[49] mostly in tropical regions. Forest degradation is also a key factor and much more difficult to quantify.[50] In tropical Asia, Houghton and Hackler (1999) have nonetheless attempted this assessment, and estimate a 26% share of carbon emissions due to forest degradation over the 1850–1985 period. In tropical Africa, Gaston *et al.* (1998) estimate that 50% of forest carbon emissions may be due to such degradation.

Moreover, downstream activities in the forest value chain are also concerned by the fight against climate change given the quantity of GHG emissions that they generate (methane from the decomposition of sawmill waste, for example).

[48] For more detail on the development of international climate change policies, see Gupta (2010).

[49] Previous and now out-of-date figures published in the last IPCC report estimated that deforestation accounted for 20 to 25% of global emissions (IPCC, 2007).

[50] The IPCC underlined the difficulty of defining degradation and proposes a framework definition based on carbon stocks: "A direct human-induced long-term loss (persisting for X years or more) of at least Y% of forest carbon stocks [and forest values] since time T and not qualifying as deforestation or an elected activity under Article 3.4 of the Kyoto Protocol" (IPCC, 2003, p.19).

Despite the crucial role played by forests in climate change, international climate negotiations were slow to take this topic on board. Forest themes can be said to appear for the first time as a central issue in these negotiations at the 2005 Montreal COP11.[51] Table 11 lists the different levers in the forestry sector that can be used to mitigate climate change, along with the associated financing opportunities. As the subject of our study is forest management, we will focus specifically on the upstream activities of the forest value chain.

**Table 11** *Typology of carbon mechanisms in the upstream and downstream forest value chain*

| Upstream → | | | Downstream → | |
|---|---|---|---|---|
| **Forest** | | | **Forest industries** | |
| REDD | *Afforestation & reforestation* (A/R) CDM | Improved silvicultural management (REDD +) | **Development of biomass-to-energy conversion (including sawing waste and prevention of emissions from the decomposition of this waste) CDM** | Recycling of wood product materials |

*Note: the mechanisms recognised by the Kyoto Protocol, which thus give rise to credits tradable on the carbon market, are in bold.*
*Source: based on Chenost* et al.*(2010).*

Today, three carbon finance mechanisms integrate tropical forests and are promoted as pro-SFM instruments: the Forest CDM on the compliance market, forest finance within the voluntary market and the REDD+ mechanism.

[51] See the ONFI and AFD (2011) document for the history of how the theme of forests came to be included in climate negotiations.

### 3.2.3. *The Forest CDM*

To reach the binding emission reduction targets set for them by the Kyoto Protocol, the industrialised countries,[52] which are historically the highest emitters, can *(i)* reduce GHG emissions within their own borders, for example, by changing their industrial and energy policies, *(ii)* trade by selling and/or buying emission permits with other emitting countries or *(iii)* finance a project that will reduce emissions in another country. If the project is implemented in an Annex B country, this is known as joint implementation (JI) and, in the opposite case, as CDM. With very few exceptions such as Australia or French Guiana, tropical forests are located in non-Annex B countries. The CDM has thus emerged as the main carbon finance mechanism applicable to tropical forests on the compliance market (regulated by the Kyoto Protocol).

Yet, at the The Hague COP6 in 2001, the question of whether forest projects should be eligible for CDM gave rise to widely diverging views between NGOs and European governments, on the one hand, and non-European countries, on the other: the NGOs and the European countries opposed eligibility due to the difficulties of monitoring, to possible negative environmental impacts and problems linked to land tenure in developing countries (Lecocq & Ambrosi, 2007). The CDM as a whole, and particularly the Forest CDM, was thus adopted late in the Kyoto Protocol negotiation process, and is sometimes deemed an "*empty shell*" (Lecocq & Ambrosi, 2007). Finally, after discussion, afforestation and reforestation (A/R)[53] activities were the only elements included in the CDM[54] under the Land Use, Land-Use Change and Forestry (LULUCF) reporting framework, which uses the IPCC-defined emission accounting rules (IPCC, 2003). Tropical forest conservation projects are thus excluded. Apart from the rule limiting eligibility to afforestation and reforestation projects, forestry projects under CDM must also meet the additionality criterion (a project developer must demonstrate that the project would not have been implemented, had it not be included in the CDM). Projects must also establish a baseline scenario (a scenario without a CDM project) and calculate leakages (project-induced emissions outside of the project's perimeter).

[52] These countries are listed in Annex B of the Kyoto Protocol. They correspond to the countries listed in UNFCCC's Annex 1.

[53] The FAO defines afforestation and reforestation for the Clean Development Mechanism as follows: "afforestation" is direct human-induced conversion of land that has not been forested for a period of at least fifty years to forested land, whereas "reforestation" is the conversion of more recently deforested land to forested land (Neeff, 2008).

[54] However, the emissions of an Annex B country that can be offset by CDM-eligible activities and which relate to afforestation/reforestation activities must not exceed 5% of the country's total emissions (UNFCCC, 2001).

Moreover, CDM projects create non-permanent credits, meaning that carbon storage is considered to be limited in time because the forest cover may be destroyed at some future date, most often by forest fires or land-use conversion (Chenost *et al.,* 2010). Their inclusion in the Kyoto Protocol target accounting thus lapses after a certain number of years. This factor, combined with the delay in defining the methodological framework for such projects, high transaction costs and the complexity and lengthy time required to design CDM forestry projects, has made them considerably less attractive to project developers (Chenost *et al,* 2010): "The Forest CDM, no one wants it" (CDC Climat interview).

The first A/R project under the CDM was implemented in India in 2006. Since then, the number of projects has risen only very slightly and now accounts for a mere 0.8% of all CDM projects (Diaz *et al.,* 2011). So far, sixty-five CDM A/R projects have come to fruition in the non-Annex B countries, [55] twenty-eight of which are currently being validated. So far, no carbon credits have been issued on the market, as the promoters are obliged to wait until the end of the first commitment period, that is, the end of 2012, before putting their credits on the market.

Although the Forest CDM is not highly representative of the mechanisms that support an SFM approach, [56] it is nonetheless important, as the debates it has sparked have also influenced the mechanisms described below.

### 3.2.4. *The REDD+ mechanism in view of Post-Kyoto*

#### The slow-moving construction of the REDD+ mechanism

As we have just seen, the CDM focused on afforestation and reforestation, but did not take into account the nonetheless critical issues of deforestation and forest degradation. These, however, gradually resurfaced in the COP11 discussions in December 2005, with the definition of the process for reducing emissions from deforestation (RED). Two years later in Bali (COP13, 2007), the Parties agreed on the possibility of integrating activities to reduce forest degradation, in addition to those to combat deforestation. The RED concept thus broadened out to REDD (the second

[55] Today, CDM forestry projetcs exist in the following countries: Albania, Argentina, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Democratic Republic of the Congo, Ethiopia, India, Indonesia, Kenya, Laos, Moldavia, Nicaragua, Niger, Paraguay, Peru, Senegal, Tanzania, Uganda, Uruguay, Vietnam.

[56] We note here that the CDM is cited only 16 times in our corpus of scientific texts on sustainable forest management (by way of reminder, this corpus comprised over 1,300 texts) and none of our interviewees talked to us about it. It is, in fact, most often addressed at an academic level (for teaching purposes, in research to fine-tune specific techniques in order to implement a given mechanism, etc.).

"D" designating "degradation"), then to REDD+ in 2010 (COP16, Cancun), the "+" standing for the "conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" (UNFCCC, 2011, p.26). Today, a REDD++ is under discussion. This could include, in addition to the activities already mentioned, activities such as agroforestry, sowing under plant cover, conserving trees outside forests and increasing inputs to reduce the areas of land required.

Apart from broadening REDD to REDD+, the COP16 also paved the way for the concrete construction of this mechanism by setting out the broad lines for the measures to be implemented in developing countries. This involves preparing a three-step national strategy based on a national inventory and a system for monitoring, reporting and verifying emissions. On the other hand, although the details of the REDD+ mechanism were again discussed at the Durban COP17 in December 2011, no quantitative objective was announced.

This mechanism is incentive-based (as it provides for compensation to countries that successfully reduce their rate of deforestation compared to a baseline) and due to be integrated into the "Climate regime" that is to succeed the Kyoto Protocol, which is currently still in force. In 2012, therefore, REDD+ as such has yet not been launched. The type of compensation mechanism and the details of its practical operational and funding modalities are still under discussion, and the subject has triggered many reservations. Nevertheless, the "readiness" phase of REDD+ was officially started in 2007. Before committing to incentive-driven compensation based on results, it was unanimously decided that prior investments were required. As a result, preparations for REDD+ are now underway at all levels (international, sub-regional, national, local) (Wertz-Kanounnikoff & Kongphan-Apirak, 2009) supported by various funds set up for this purpose.[57] REDD+ currently channels most of the funding devoted to tropical forests (Smouts, 2001; Simula, 2008; Association for Tropical Biology and Conservation and Society for Tropical Ecology, 2009). We are thus witnessing a "REDDisation" of projects involving forest management and conservation (Bernard *et al.,* 2012). Moreover, all REDD+ pilot projects defend the fact that they support SFM, even though it is still unclear which actions are eligible for REDD+ benefits, as we shall see below.

[57] Among some of the main sources of funding are the Forest Carbon Partnership Facility (FCPF) and the World Bank's Forest Investment Program (FIP), the United Nations UN-REDD Fund and Congo Basin Forest Fund (CBFF) (Chenost *et al.,* 2010).

## A lack of clarity on which actions are eligible for the REDD+ mechanism

Bernard *et al.* (2012) point out that the scope of REDD+ eligible activities was gradually extended during the design of the REDD+ mechanism (UNFCCC, 2007). The REDD+ scope of application today includes activities aimed at (UNFCCC, 2011):

- reducing emissions from deforestation
- reducing emissions from forest degradation
- conserving forests
- enhancing forest carbon stocks
- managing forests sustainably.

The authors also note that these activities seem to overlap, at least partially. This is because, in the underlying negotiations that took place, various climate convention stakeholders or influential actors required that the forest issues concerning them receive mention. The difference between deforestation and degradation is easy to understand even if, technically speaking, degradation is difficult to determine: deforestation refers to a reduction in forest area: degradation points more to the reduction of biomass density in forest areas.

On the other hand, it is rather more complicated to define what determines the three following activities:

- activities termed "conservation" activities, which target forest areas not necessarily under threat of deforestation when the conservation activities are implemented, but which nonetheless help to protect against deforestation in the long run;
- activities that increase forest carbon stocks, which aim either to enhance already existing forests or to restore forests on non-forested land suitable for forestry;
- lastly, SFM spans a group of practices that must aim at "good" management of the forest resource (Bernard *et al.,* 2012).

The actions referred to in the five REDD+ activities can be classified according to two criteria (*cf.* Table 12): :

- does it involve a change from "non-forest" to "forest" or a change that enhances the carbon density of a forest?
- does it involve removing counter-incentives (avoiding the reduction of wooded area or avoiding a per hectare carbon loss), or incentivising positive change (increasing forest areas or enhancing the carbon-storing capacity of existing forests?)

Table 12 *Scope of the REDD+ mechanism in 2011*

| Changes in: | Removal of counter-incentives | Incentives for positive change |
|---|---|---|
| Forest area (ha) | Avoided deforestation **RED** | Afforestation and reforestation CDM, **REDD+** |
| Carbon density (carbon/ha) | Avoided deforestation **REDD** | Restoration and rehabilitation **REDD+** |

*Sources: based on Bernard* et al. *(2012), inspired by Lasco and Minang (2009).*

The REDD+ mechanism was first positioned as a tool to reduce negative incentives by combating forest degradation and deforestation. It was then extended, through the activities under the + sign, to include positive incentives for enhancing carbon stocks. Thus, forest restoration activities and afforestation/reforestation help respectively to increase the carbon density per hectare of already existing forests, and afforest land that was unforested but "suitable for forestry".

Forestry projects linked to the voluntary carbon market constitute the third forest carbon financing mechanism and are cited as supporting SFM.

### 3.2.5. *Forestry projects on the voluntary market*

The voluntary carbon market, originally seen as a kind of "test" for the compliance market (and for setting up REDD+), has grown considerably in recent years (Diaz *et al.*, 2011). There are several parallel markets on which carbon credits can be traded, mainly the Voluntary Over-the-Counter (Voluntary OTC) market and the Chicago Climate Exchange (CCX).[58] Several forest-related activities can give the right to issue carbon credits on these markets: activities involving A/R, REDD+,[59] Agriculture, Forestry and Other Land Uses (AFOLU) and Improved Forest Management (IFM) (Diaz *et al.*, 2011). The distinction between these activities rests on specific methodologies that will not be developed here.

[58] Other voluntary markets are not dealt with in this analysis given that they play only a small role in forest projects.
[59] Here REDD is understood in the strict sense, meaning that projects that come under REDD+ only are not included.

The OTC market is by far the largest and the longest-standing (Hamilton *et al.,* 2010) as far as forestry projects are concerned. Before 2005, it was virtually the only market on which forestry-based credits could be traded. Today, there are over 130 forestry projects on the OTC market. [60] Out of all the activities giving rise to carbon credits, A/R accounts for 5.8%, REDD for 33%, AFOLU for 5.5% and IFM for 5.8%. These projects extend across the five continents but are mostly located in North and South American countries. [61]

The CCX market was launched in 2003, propelled by thirteen members who took the voluntary initiative to reduce their GHG emissions by 4% during the 1998–2001 commitment period. During this initial phase, the influence of the CCX gradually extended until the market grouped together some hundred members. Thereafter, two further commitment periods expired (2003–2006 et 2007–2010). The CCX closed down when the third commitment period expired at the end of 2010; trading had been very buoyant in 2008 with the credits traded on this market accounting for almost half of total voluntary market trades (Hamilton *et al.,* 2010), the other half being transacted on the OTC market (Diaz *et al.,* 2011). Besides the fourteen other types of activity eligible for the CCX, only A/R and Sustainably Managed Forests (SMF) activities (equivalent to what is now termed IFM) came under forestry projects (Diaz *et al., ibid.*). While this market was operational, thirty-five CCX-eligible forestry projects were implemented, mainly in North and South American countries such as Brazil, Chile, Colombia, Costa Rica, Uruguay and the United States.

Forestry projects under the voluntary market (OTC or CCX type) are in the large majority compared with those eligible for the compliance market (CDM type). The main reason for this is that the forest CDM is less attractive to project developers. Unlike CDM projects, forest-based credits can be permanent on the voluntary market, which thus makes them more attractive to project developers. In fact, it seems that from the outset carbon finance has been perceived as a financial windfall for some forest managers (MAP interview). Forestry practices have been strongly impacted by this, with the increased development and professionalisation of forest carbon projects (Chenost *et al.,* 2010) within the framework of SFM.

[60] See the database on the site of the Forest Carbon Portal: http://www.forestcarbonportal.com/ (Forest Carbon Portal, 2011).

[61] Forest projects on the OTC market are implemented in the following countries: Argentina, Australia, Belize, Bolivia, Brazil, Cambodia, Canada, China, Costa Rica, Democratic Republic of the Congo, Ecuador, Georgia, Germany, Guatemala, Honduras, India, Indonesia, Kenya, Madagascar, Malaysia, Mexico, Mozambique, Nicaragua, New Zealand, Panama, Paraguay, Peru, Philippines, Poland, Sierra Leone, Spain, Switzerland, Tanzania, Trinidad and Tobago, Uganda, United Kingdom, United States of America, Vietnam.

We will now address the third and last category of SFM-related management arrangements, which involves mechanisms designed to increase local participation.

## 3.3. Arrangements aimed at increasing participation

Participation is not a recent concept in the development field: many authors have shown how this principle has been mobilised at different stages in the history of ideas, institutions and operators in the development arena (Richards, 1985; Chauveau, 1994; Olivier de Sardan, 1995; Leroy, 2008). Although it took time for the idea to become established in the design and implementation of forestry projects, particularly in relation to agricultural development projects, today's discourse seems unanimous and consensual: SFM can only be achieved if local populations are involved in design and implementation. As we showed in Part 1 and Part 2, the international debate on forests and many international conferences have played a key role in achieving this. In 1992, Agenda 21 specified that: "Environmental issues are best handled with the participation of all concerned citizens, at the relevant level" (United Nations, 1992*a*, Principle 10). And again: "Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices" (United Nations, 1992*a*, Principle 22). The forest law reforms undertaken in developing countries also gradually institutionalised the notion of participation in forest management systems: the planning processes initiated in some countries through the NFPs and national environmental management/action plans (NEMP/NEAP) recommended in the late 1990s "the participation of all" (Nguinguiri, 1999).

Over 30% of the texts in our scientific text corpus touch on the question of participation and link it up with specific management arrangements. The international and national legal texts analysed also very frequently address these topics.

The notion of participation nonetheless has multiple meanings: although participatory management methods have become increasingly standardised since the 1980s (Leroy, 2008), the arrangements used to promote the participation of local populations remain highly diversified. The nature of these arrangement can differ substantially depending on what place is given to the effective involvement of local communities in resource governance, on what access and use rights are given to the communities who rely on these resources, and on what ownership rights are assigned to these communities (Rasul *et al.,* 2011). Schlager and Ostrom (1992) identify different participatory management regimes based on a typology that distinguishes between the

rights of *(i)* access to the resource, *(ii)* withdrawal, *(iii)* management, *(iv)* exclusion and *(v)* alienation.[62]

Table 13 illustrates this diversity with a few relatively well-known country examples: joint forest management in India, community forestry in Mexico and communal forest management in Cameroon.

**Table 13** *Rights regimes for the different types of governance of three participatory forest management approaches*

| Country | Type of governance | Access rights | Withdrawal rights | Management rights | Exclusion rights | Alienation rights |
|---|---|---|---|---|---|---|
| India | Joint management | x | case by case | – | 0 | 0 |
| Mexico | Community management | x | x | x | x | whole or partial |
| Cameroon | Communal management | x | x | x | x | x |

x: Rights guaranteed by law.
0: Rights not guaranteed by law.
–: The communities' right to participate in creating management plans is guaranteed by law.

*Source: based on Schlager and Ostrom (1992).*

[62] Access right: the right of a community or its members to enter a defined forest area. Withdrawal right: the right of a community or its members to use and benefit from NWFPs and wood resources in a defined forest area. A community can hold a withdrawal right for subsistence and/or commercial purposes. Management right: the right of a community or its members to take part in defining the internal rules for accessing, harvesting or transforming the resource. Exclusion right: the right of a community or its members to decide who is to be excluded or included as a holder of the three previous rights. Alienation right: right of a community or its members to sell, transfer or share the forest area concerned, including the sale or leasing of all the other previously mentioned rights (Schlager & Ostrom, *ibid.*).

### 3.3.1. *Joint forest management in India*

The concept of Joint Forest Management (JFM) emerged towards the end of the 1970s in India in the States of Haryana, West Bengal and Madhya Pradesh (Bhattacharya *et al.,* 2010). As the administration and forest-dependent communities had observed a clear degradation of forest ecosystems, it was decided to establish "contracts", initially on a very informal basis. These formalised the first initiatives for cooperation between the State's forestry services and local communities. On the strength of these innovative experiences, the new forest policy of 1988 (Republic of India, 1988) fully endorsed such approaches by launching the Joint Forest Management programme.

Today, over 22 million ha across 28 States are managed under JFM programmes. These encompass a sizeable part of India's forest areas and include different types of forest, ranging from logged forests to protected areas. Each programme provides for the creation of groups to represent the communities and be in charge of resource planning and management: the Village Forest Committees (VFC) and the Eco-Development Committees (EDC). The role of these committees is both to ensure the protection of sensitive areas and promote the restoration of degraded areas. They decide on and plan the operations to be carried out through their management plans. The State, via its forestry department, is directly represented on these committees, where it retains the power to approve management plans and supervises the smooth functioning of operations.

JFM does not provide for the transfer of property or lay down the modalities for managing the forest estates concerned, but it grants limited management rights for harvesting secondary wood resources and NWFPs. The local communities thus benefit from JFM through two mechanisms:

- a direct benefit from harvesting and marketing NWFPs and the by-products of logging activities;
- a financial windfall amounting to 50% of the profits from the sale of wood products and which is distributed for the running of these committees (the rest of the profits going to the State).

These programmes are mainly funded by multilateral aid (World Bank, Japanese Development Bank; *cf.* Republic of India, 2002), NGOs and the Indian State.

Recent experiments have been developed in Africa (Ghana, Gambia, Tanzania, Zambia, Nigeria, Ethiopia) on the lines of the Indian model.

### 3.3.2. *Community forestry in Mexico*

Many countries[63] have institutionalised community forestry as a system for managing forest resources. As this form of management has now reached a high level of maturity in Mexico, the country serves as a reference laboratory (Barton & Merino-Pérez, 2002). This pioneering role can be explained by several, mainly historical factors:

- the 1917 revolution gave rise to far-reaching agrarian reform that quickly stabilised the land tenure system and recognised the indigenous people's ownership of land as well as their control over resources. However, even though local communities acquired a certain degree of autonomy during this period, management decisions remained firmly in the hands of the State;
- the 1992 reform of forest policy accelerated the devolution of state powers to rural communities, and the 2003 revision of the forest law sealed the setting-up of forest communities.

Currently, an estimated 80% of Mexico's forests are legally controlled by these communities (Barton *et al.,* 2003). There are two governance regimes for Mexican community management, known as *ejidos* and *comunidades.* The difference between the two relates to the alienation rights of the forests they govern: the *ejidos* have full ownership of their forestland whereas the *comunidades* cannot sell their land. More than 3,000 *ejidos* and *comunidades* communities are today legally recognised in Mexico, and thus have full rights in the procedures for managing forest resources (Bray, 2004). Resource use is planned and regulated by a management plan entirely under the community's responsibility. In this system, the State has only a limited responsibility, which is to certify that the plans are legally compliant. The area designated as "community forest" is formalised by a convention signed between the administration and the community.

Apart from the Mexican example, there are many other diversified forms of community forest tenure regimes across the world (Almeida & Hatcher, 2011). For instance, the Brazilian forest reserves, the *Reserva extrativista* (extractivist reserve) and the Reservas de *Desenvolvimento Sustentável* (sustainable development reserves), managed by communities since 2000, only have access and withdrawal rights on their forestland. Similarly, the *Hutan Kemasyarakatan,* a type of community forest set up in Indonesia in 1999, does not give local populations the opportunity to participate in defining the management rules, which are set by the State.

[63] The following countries should be mentioned: Benin, Bolivia, Brazil, Cambodia, Cameroon, Colombia, Gabon, Gambia, Ghana, Guatemala, Indonesia, Laos, Madagascar, Nicaragua, Panama, Papua New Guinea, Philippines, Tanzania, Thailand, Uganda, Vietnam and Zambia.

The Mexican case thus stands out insofar as the communities involved are granted management rights and alienation rights by law. Also, administration of the forestry sector in Mexico is highly decentralised, as is illustrated by example of the Mexican Community Forest Enterprises (CFEs), which organise themselves on the basis of collective resource management, be it logging, processing or marketing. The profits from forest exploitation, particularly from softwood timber production, accrue to the communities, who can also choose to hand over exploitation to private logging companies on a concessionary basis. Some authors consider that this type of forest management is sustainable due to the degree of state devolution in this sector (Barton & Merino-Pérez, 2002; Barton *et al.,* 2003; Bray, 2004).[64]

### 3.3.3. *Communal forests in Cameroon*

The 1994 forest law in Cameroon (République du Cameroun, 1994) brought about deep reform to forest management by officially formalising the principles of local community participation. Drawing on the achievements of the Dimiko integrated forest management project (API-DIMAKO; Durrieu de Madron *et al.,* 1998*c*), the Cameroon State institutionalised the principle of communal forests (CF). According to Article 30 of Cameroon's main forest law, a communal forest is "any forest registered under the commune or planted by the commune".

The CFs represent a new intermediate type of forest management, situated somewhere between a community forestry model and conventional state-run logging operations or concession logging (Poissonnet & Lescuyer, 2005): what they have in common with concessionary models is the objective of commercial logging based on technical and sophisticated management, but, like participatory management models, they need to integrate the diverse interests of the local populations concerned (*i.e.* the citizens of the rural commune).

Sixteen CFs were initially planned in the 1995 zoning plan (FAO, 2008), but today there are only seven nationwide, each being classified by ministerial decree (CBFP, 2011). The CFs are generally of limited size (from 10,000 to 20,000 ha) compared with national standards for logging activities (generally from 50,000 ha to over 100,000 ha; *cf.* Nguenang *et al.,* 2007). The CFs belong to the State's permanent forest estate[65] and thus, like FDUs, are subject to management plans that are strict and rigorous from a legal point of view. However, unlike FDUs, which often remain

[64] Translator's translation.

[65] Permanent forest estate corresponds to one of the land categories of the Cameroonian forest areas.

under concession to private operators, the CFs become the exclusive property of communes and are transferred to them definitively, with no lease or concession period (République du Cameroun, 1994). Decisions on how to manage and use forest resources (wood and non-wood products) are the sole responsibility of the communal (or municipal) council, which represents all the citizens in a given commune and is thus directly accountable to them. The CFs integrate local communities through three participatory approaches (Poissonnet & Lescuyer, 2005):

- an information meeting before a forest estate is classified as a CF;
- the local community's uses and needs are integrated into the management plan;
- the creation of a consultative committee represented by the citizens and which seals the transfer of power from the State to the community.

CF experiences are very recent and relatively numerous in developing countries. Some countries have already adopted the legal provisions to give them a framework (Ghana, Laos, Philippines, Senegal, Vietnam, etc.) whereas others are still at an experimental stage with local initiatives and projects (Benin, Cambodia, India, etc.).

The participatory dimension has undergone some profound changes since the SFM paradigm emerged, leading to changes in the way the modalities of renewable resource management are conceived. Yet in the opinion of some – and regardless of political declarations – participation is still not recognised in the forestry sector as a full-fledged "management framework". Instead, it seems to be viewed as a tool that is likely to provide a response to the social aspect of sustainable development (Kouplevatskaya, 2007). Consequently, the various forms of decentralised management seem to reflect above all the will to internalise the social pillar into a logic of resource exploitation. Participatory forest management arrangements (community, joint or communal management) are nonetheless still developing in a great many contexts where there is often a high asymmetry of power between the state authorities in charge of forest management and the local communities, who end up being side-lined, but, at the same time, where the illusion is created of building a model in which all stakeholder interests are equally represented (Oyono, 2004; Leroy, 2008).

At the end of this third part of our study, it appears that SFM, which was formally recognised twenty years ago, now covers a real diversity of practices. The operationalization of the concept nonetheless reflects a relatively limited number of key arrangements and mechanisms based on theoretical frameworks and ideological formats specific to the actors mobilising them: improving logging practices, enhancing carbon stocks and increasing local community participation are the forestry sector's

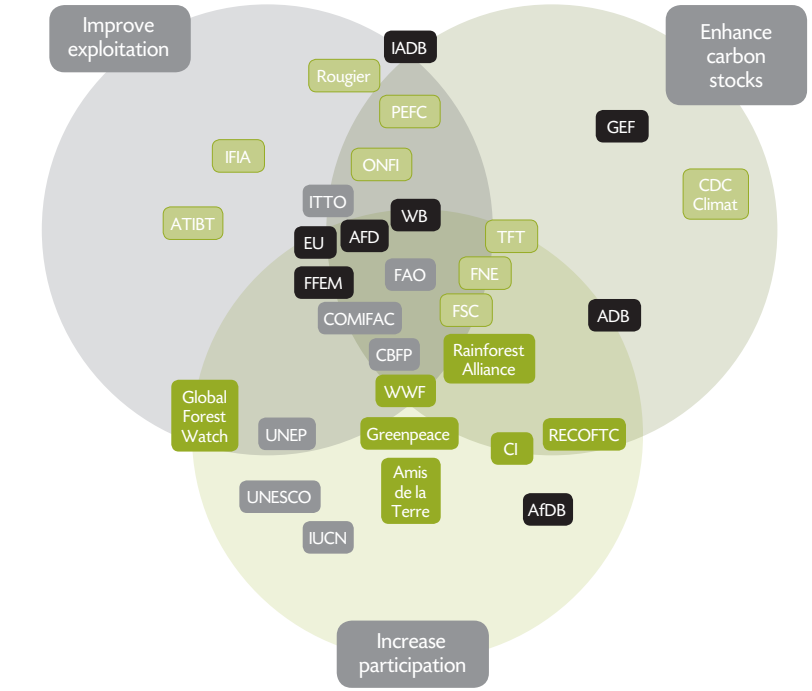
main operational responses to the issues of sustainable development. Before examining the way in which SFM has or has not addressed forest-related environmental issues, this seems a suitable place to raise two points that we deem crucial.

First, behind the seeming polysemy of the SFM concept, SFM arrangements do share some similarities with respect to the overall form of governance characterising them. Many of them advocate a regulatory model that is market-based and relies on contracting between stakeholders. The State's role of providing technical support has gradually dwindled to focus on providing the legal framework required for implementing the arrangements promoted. Today, management as such is mainly in the hands of private operators or public-private partnerships. These doctrines, typical of the standardisation of sustainable development (Leroy, 2010), exacerbates the fragmentation of projects and lead to their implementation under multiple regulatory authorities that promote voluntary initiatives rather than binding or interventionist rules. This mainstreaming operates through the setting up of reference frameworks, which are themselves struggling to become recognised as a "standard". In this standardisation process, international audit bodies are playing a very active role (Leroy & Lauriol, 2011), with forest certification schemes and the definition of PC&I being the most concrete example of this (Mione *et al.,* 2009).

Additionally, although the different types of management arrangements described above have been presented separately, it is clear that in most contexts these different arrangements take on a hybrid form. The different actors use one arrangement commingled (or not) with another and adopt relatively different positions on the forestry playing field depending on the sustainable development issues (economic, social, environmental) that they are addressing. Figure 2 proposes a strategic projection of the actors' interactions resulting from this positioning.[66] Although incomplete, it clearly shows that the management arrangements are not neutral and the choices made trigger controversy about which solution should be promoted depending on the contexts and objectives targeted.

[66] For a certain number of forest management stakeholders at international level, we assessed the tendency to use one or other of the management systems. This assessment was based on qualitative criteria which enabled us to estimate the weight of each system in the bibliographical production, particularly the grey literature and the discourse of each of the stakeholders interviewed (see the list of acronyms and abbreviations).

**Figure 2** *Hybrid forms of SFM arrangements according to the main forest actors.*




*Source: the authors.*

It is essential to underline that, although the arrangements identified clearly show specific polarities (improve logging practices, enhance carbon stocks, increase local community participation), they basically remain focussed on developing the forestry industry in line with a rationale that internalises environmental and social externalities and pursues above all an economic goal. What then can be concluded from an environmental point of view? To what extent has integrating the SFM paradigm made it possible to respond to the environmental issues in tropical forests? These questions will take centre stage in the next and last part of our study.

# 4. What responses is sustainable forest management delivering on environmental issues?

The first three parts of this book have attempted to review the emergence of the SFM concept, and how it has materialised not only from the regulatory point of view but also in terms of the management arrangements implemented. This last and more analytical chapter raises the question of whether the environmental issues involved in managing tropical forests are effectively taken into account – issues that have been fundamental to the very definition of the SFM paradigm.

It first looks at the state of tropical forests in 2012 – a picture that only reinforces the topicality of the question. It then goes on to analyse how environmental concerns are addressed in SFM-related literature, particularly the issue of biodiversity conservation, which is still an underrated, if not forgotten, aspect of this management. The chapter then returns to the regulatory texts and management arrangements presented earlier and carefully examines their strong points and the criticisms levelled at them concerning environmental issues. Finally, before concluding, we turn to the environmental assessment process, which is one of the main tools to support and improve policies, projects and programmes that could be potentially harmful to the environment, with special focus on its implementation in the forestry sector.

## 4.1. The state of forests in the tropical zone is still a cause for concern

Methods developed since the 1980s, and which are still evolving, now enable a relatively precise diagnosis of global and tropical forest cover, providing rates of deforestation – and even degradation – for the forests surveyed. Various studies have also identified the causes of these harmful processes.

### 4.1.1. *The place of tropical forests in the world*

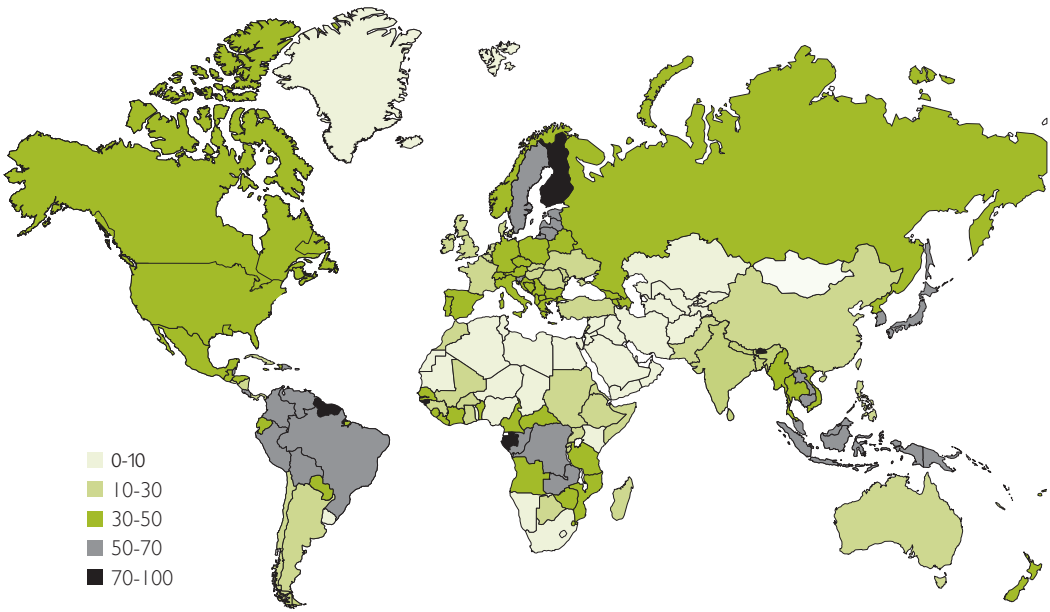
According to the figures of the latest Forest Ressources Assessment (FRA) by the FAO [67] (FAO, 2011), forests covered 4,033 million ha, equivalent to 31% of total land area, against 4,168 million ha assessed in 1990. Tropical forests occupy 36% of the world's forestland, that is, 1.5 billion ha compared to 1.8 billion ha assessed in 1990 (*cf.* Box 7). These comparisons between 1990 and 2011 are subject to caution because, as we will show, the accounting methods for forest cover have changed enormously in twenty years.

The generic term "tropical forest", which is used for all forests in the intertropical zone, hides a broad diversity of ecosystems designated by a host of classification systems. The classification of UNEP's World Conservation and Monitoring Center (WCMC) (UNEP-WCMC, 2004) distinguishes fifteen types of tropical forest (including mangroves, disturbed natural forest, plantations, etc.). The classification proposed by the FAO in the FRA 2000 (FAO, 2001a) and used by Millennium Ecosystem Assessment (MEA, 2005) proposes six ecological zones for the tropics, four of which are forest: tropical rain forest or evergreen forest, semi-evergreen forest, tropical dry forest, shrubland, tropical desert and mountain rain forest.

Among the forest-rich countries (*cf.* Map 5), the large tropical forest countries stand in good place: Brazil has the second largest forest area in the world (520 million ha), the Democratic Republic of the Congo holds sixth place (154 million ha) and Indonesia comes in eighth place (94 million ha) (FAO & ITTO, 2011). In the three large rainforest basins, forest-covered areas are particularly extensive: 60% of the area in the Amazon Basin, 57% in the Congo Basin and 51% in Southeast Asia are wooded, with a world average of 31% (FAO & ITTO, 2011).

[67] The assessments of the world's forest resources (FRA) are a set of documents published periodically by the FAO based on country-reported information that is supplemented with data obtained by remote sensing technology (for more details on the method used, consult the latest FRA in FAO, 2011). The scope and content of these assessments have changed over time to adapt to new information needs. The main objective of the first assessments was to estimate the availability of wood, given concerns about a world wood shortage in the wake of the Second World War; today, the assessments follow a wider approach in order to provide an overall view of global forest resources, their management and use. As these data are the only data available at global level, they serve as a reference on the subject, although they are certainly open to criticism (*cf.* Box 8).

## Map 5 *Forest area as a percentage of total land area by country, in 2010*




*Source: based on FAO (2011).*

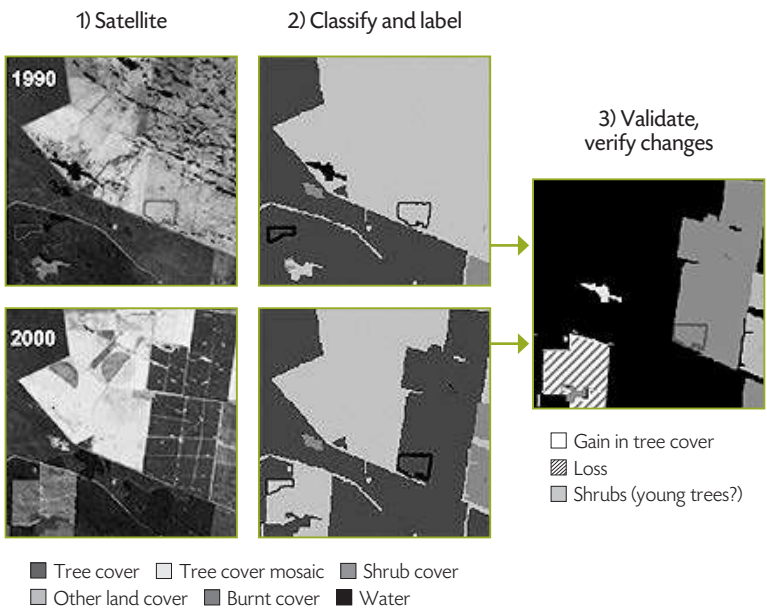
## Box 7 *Technological innovation for assessing deforestation and forest degradation*

**FAO's remote sensing programme**

In 2008, the FAO launched a global survey of forest areas using remote sensing techniques (automatic analysis of Landsat images reviewed by over 200 national experts). "The use of remote sensing has the advantage of consistency in data and methodology and this survey has been specifically designed to detect and report on forest area changes at a global, regional and ecological zone scale" (JRC & FAO, 2011, p.6). The first results led to a reassessment of some figures reported by the FRA in 2010 (FAO, 2011; JRC & FAO, 2011). Figure 3 shows the method used for this survey.

•••

Figure 3 *Example of steps involved in processing Landsat data to produce a classified land cover map and the resulting land cover changes, 1990–2000*




*Source: based on FAO (2011).*

### Fine-tuned technologies to assess forest structure

On a much more detailed scale, different research studies aim to analyse a forest's structure and, in some cases, its biodiversity. Examples of this include the work of the Carnegie Airborne Observatory, which uses airborne light detection and ranging (LiDAR) mapping techniques to detect the chemical composition, structure, biomass and biodiversity of an ecosystem (Asner *et al.,* 2011; Carnegie Airborne Observatory, 2011), and the work of Barbier on the use of open-access very high resolution satellite imaging (such as Google Earth®; Barbier *et al.,* 2010). These techniques, still under development, should provide crucial information on the degradation of forest ecosystems and their carbon storage capacities, which can then be used in all kinds of ways, notably for the REDD mechanism.

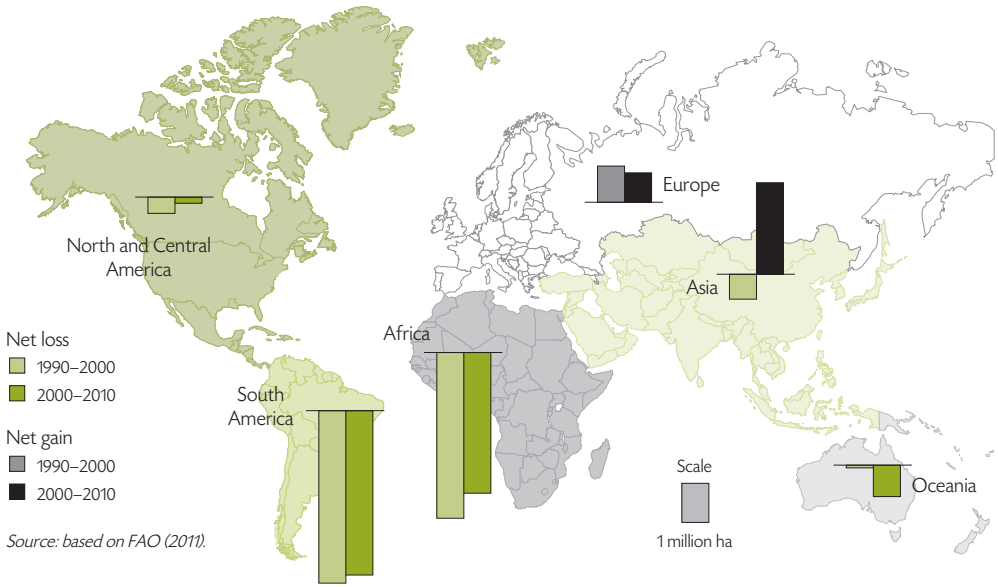
### 4.1.2. *An alarming rate of deforestation*

The FAO's 2010 global forest resources assessment (FAO, 2011) reports an "alarming" rate of deforestation.[68] Over the 2000–2010 period, the average rate of gross deforestation[69] (due to land-use change or natural causes) on a global scale was an annual 13 million ha compared to an annual 16 million ha for the previous decade (1990–2000). Even though the deforestation rate seems to have slowed down somewhat, this figure remains deeply worrying, particularly with regard to tropical forests. Focussing on the tropical zones, Maps 6 and 7 (FAO, 2011) show severe loss of forest areas, which corroborates the results of the FRA remote-sensing survey (JRC & FAO, 2011). The FAO thus reports that all "three rainforest basins reported a net loss of forest area of 5.4 million hectares per year for the period 2000–2010", for a total forest area in the three basins of 1.3 billion ha (FAO & ITTO, 2011, p.14). At first sight, this figure certainly appears to be "down from 7.1 million hectares per year during the previous decade" (*ibid.,* p.14) but in fact corresponds to a net change that is "the sum of all negative changes due to deforestation and natural disasters and all positive changes due to afforestation and natural expansion of forests" (FAO, 2011, p.xv). The net deforestation figures do raise some questions, as explained in Box 8: these figures are in fact partly offset by the areas of forest plantation which have been on the rise since 1990 (FAO & ITTO, 2011), whereas the environmental quality of these areas is far from equivalent.

The Amazon Basin reported the highest net loss (about 3.6 million ha per year from 2000 to 2010), followed by Southeast Asia (1 million ha per year) and lastly the Congo Basin (about 700,000 ha per year) (FAO & ITTO, 2011) (*cf.* Maps 6 and 7).

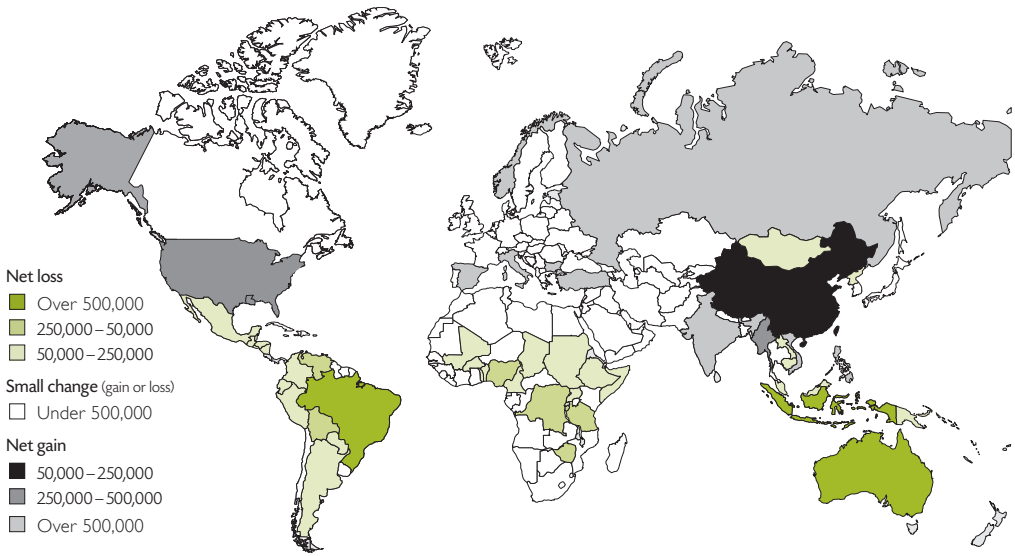
[68] The FAO has its own definition of deforestation (*cf.* Box 8).
[69] Note that the FAO only gives gross deforestation figures for the whole of the world's forest area (cf. Box 8).

## Map 6 *Annual change in forest area by region for the periods 1990–2000 and 2000–2010 (in millions ha/year)*




*Source: based on FAO (2011).*

## Map 7 *Annual change in forest area by country, for the period 2005–2010 (in thousands ha/yr)*




*Source: based on FAO (2011).*

## Box 8 *Deforestation: knowing how to interpret the figures*

The FAO's series of FRA reports provide the only available figures for forest areas on the global scale and, for this reason, they are extremely important. The methodology and definitions used by the FAO are clearly explained. It is important to keep in mind that any choice of methodology has an inevitable impact on results. The purpose of this Box is to identify the methodological points that lead to frequent discussions on the FRA figures.

**Definition of "forest"**

The FAO defines a forest as land "spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 per cent, or trees able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use" (FAO, 2004*a*, p.16). A unique standardised definition of what constitutes a forest is necessary in order to establish global figures on forests, and more particularly on deforestation. Yet, the structural diversity of the world's forest ecosystems inevitably reveals the limits of such a definition. Thus, mono-species plantations fit this definition of a forest, which poses a problem if their low biodiversity value and the narrower range of ecoservices they provide are taken into account.

**Net change in forest area**

The FAO defines the change in net forest area as being equal to the "sum of all negative changes due to deforestation and natural disasters and all positive changes due to afforestation and natural expansion of forests" (FAO, 2011, Box 1, page xv). This means that the deforested area can be offset by plantations and this could even result in a net gain of forested area (this is the case in Asia with the immense plantations created by China). The implicit assumption here is that natural forest and plantations are equivalent. This choice is criticised in many quarters, mainly environmental NGOs and researchers, who stress the absurdity of this calculation, especially since the FRA provides gross deforested area figures only at a global scale. If one is interested in a country or region, the only figures available are those concerning net land-use changes. It is thus easy to imagine the shortcuts that can be taken when using these figures.

**Reporting differs across countries**

FRA data are obtained from countries' self-reported data (these in turn are based on national forest inventories or expert opinions), and supplemented by remote-sensing data. The data collection methodology is thus inconsistent, which necessarily gives rise to inaccuracies in the areas calculated: "Previous figures underestimated the global deforestation rate for the 1990s" (FAO, 2011, Box 2, page xv). The FAO's remote sensing programme (*cf.* Box 7) sets out specifically to overcome these methodological shortcomings.

*Source: the authors.*

### 4.1.3. *Severely degraded forests*

Forest degradation is defined by the FAO as "changes within the forest which negatively affect the structure or function of the stand or site, and thereby lower the capacity to supply products and/or services (FAO, 2004*a*, p.26). This definition is far less precise than the definition of a forest, which serves as the basis for estimating deforestation figures. Degradation is thus difficult to quantify. "Given the lack of knowledge on ecosystems, defining a reference state on which degradation can be assessed can be complex" [70] (Lanly, 2003). However, the *Millennium Ecosystem Assessment* (MEA, 2005) gives the figure of 789 million ha of fragmented or open forests. Forest degradation has huge environmental impacts, as it can ultimately lead to deforestation (Guéneau, 2011) and forest fragmentation, which restricts habitats for wildlife and impacts all the ecological processes (seed dispersal, pollination to maintain genetic diversity, etc.).

### 4.1.4. *Direct and indirect threats*

Guéneau (2011) identifies and gives a detailed description of the many direct and indirect threats to forests (*cf.* Figure 4) that contribute to biodiversity loss and exacerbate climate change problems. He distinguishes immediate causes from underlying causes. Other authors refer to direct and indirect causes (Geist & Lambin, 2002).

Agriculture is identified as being the overriding cause of tropical deforestation [71] (Shvidenko *et al.,* 2005; FAO, 2011). Although several studies have shown that forests can be quite resilient to small-scale traditional slash-and burn agriculture (Chazdon, 2003), this is not the case for permanent intensive agriculture. Changing land use to livestock farming also causes extensive deforestation. In Amazonia and Central America particularly (Calvo-Alvarado *et al.,* 2009), it has been shown that trends in deforestation rates have kept apace with the price of beef on global markets, which is now dubbed the "hamburger effect".

For forestry activities strictly speaking, we can cite the conversion of natural forests to industrial plantations. Although plantations fit overall the FAO's definition of a forest, it should be pointed out that they do not harbour the same wealth of biodiversity or provide the same variety of ecoservices as natural forests. Intensive logging, illegal

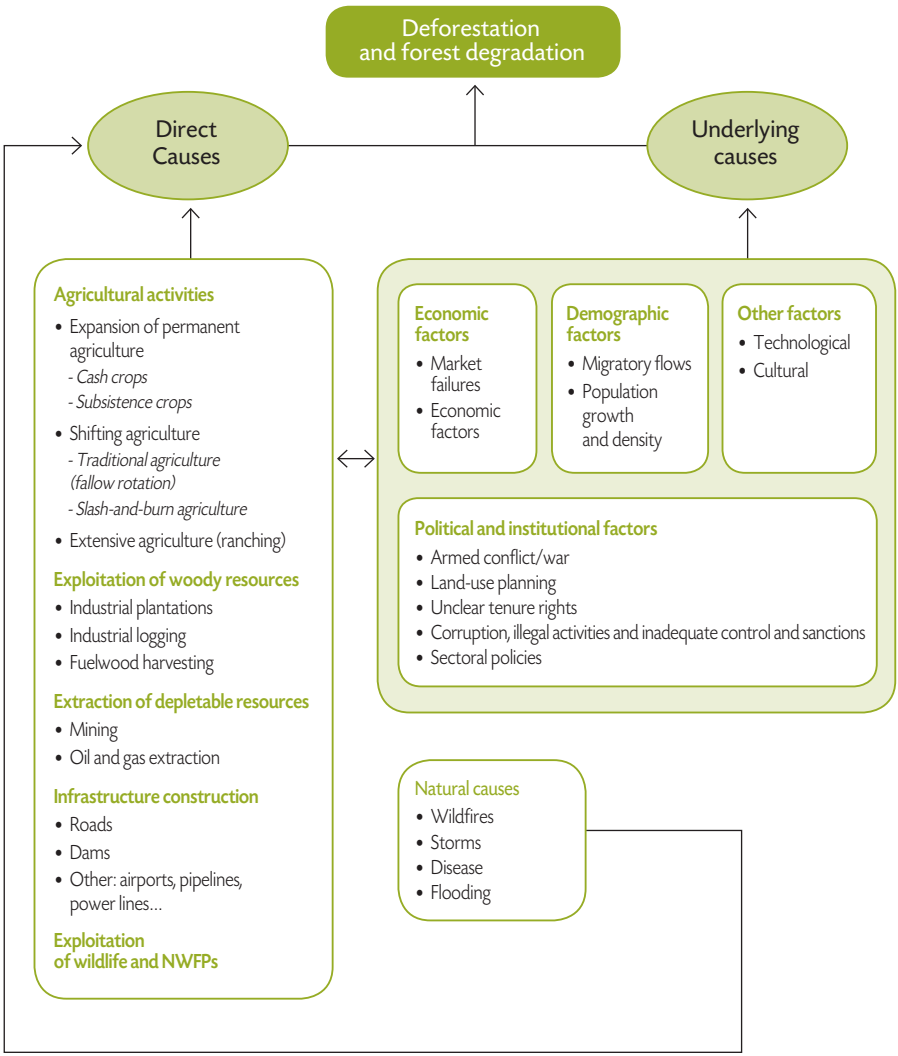
[70] Translator's translation.

[71] In their study covering 152 cases in tropical forests, Geist and Lambin (2002) have shown that agriculture was a direct factor in deforestation in 96% of the cases (including livestock farming, which alone accounts for 46%).

practices and the construction of roads and other infrastructure in forest areas are also cited as direct causes of deforestation (Shvidenko *et al.,* 2005), along with the mining of mineral, oil and gas resources.

All of the direct causes of deforestation and forest degradation depend to a large extent on economic, social and political determinants, referred to either as "indirect" (Shvidenko *et al.,* 2005) or "underlying" (Guéneau, 2011). Guéneau lays particular emphasis on the fact that poverty is not in itself a direct or indirect factor of deforestation, contrary to a view widely accepted since the 1980s. The activities of local populations on forests seem to be quite marginal and, when the effects are harmful, this is often due to government incentives for land-use changes.

Figure 4 *Immediate and underlying causes of deforestation and forest degradation*




*Source: based on Guéneau (2011), adapted from Contreras-Hermosilla (2000) and Geist and Lambin (2002).*

Despite the development of SFM, it thus seems that forests, especially tropical forests, have been subjected to intense pressures since the 1990s. This has led to forest degradation and deforestation, two phenomena that are still a cause for deep concern.

How is this state of affairs to be explained given that SFM has now been operating for twenty years in order to curb deforestation and improve ecosystem management? Why have results been so poor despite the scientific activity surrounding SFM (which we have just described); despite the fact that the concept has been highly institutionalised from a regulatory point of view and integrated into the public policies of many States; and, finally, despite the existence of the diverse management arrangements that SFM has helped to implement? We will now examine these questions through a deeper analysis of the environmental issues that SFM actually takes on board. We begin by examining the academic field and then go on to analyse how effectively the SFM dimension is taken into account first in forest legislation, and secondly in management arrangements.

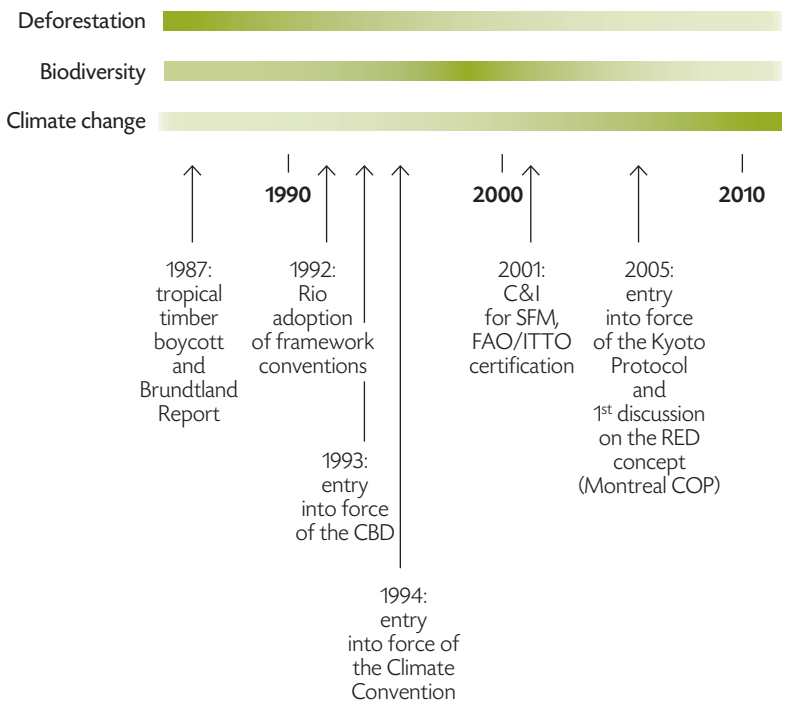
## 4.2. Environmental concerns found in the scientific literature on sustainable forest management

### 4.2.1. *What are the trends?*

The lexicometric analysis of our corpus of scientific papers on SFM identified those keywords most used by authors dealing with environmental topics (*cf.* Appendix 3). Three main concerns appeared one after the other in the wake of the more general debates that took place in the area of environmental policy (*cf.* Figure 5). The early 1990s were characterised by the attention given to the overall theme of deforestation. Once the Convention on Biological Diversity had came into force in 1993 (United Nations, 1993), *biodiversity* issues began to develop, reaching a head at the beginning of the 2000s. The issue of *climate change* then emerged, growing rapidly from 2005 – a year marked by both the entry into force of the Kyoto Protocol and the first REDD discussions at the UNFCCC COP11 in Montreal.

These trends seem to indicate not only that international negotiations significantly influence which SFM themes are taken up by research, but also that the scientific community working in this field tends to focus on existing debates rather than initiating new ones. Moreover, we can see that one environmental concern tends to supplant another, following the changes in direction of these debates.

Figure 5 *How environmental concerns have evolved in the scientific literature obtained from a keyword analysis of 1,160 bibliographic records of English-language scientific papers sourced from scientific journal databases*
(Web of Science and Scopus)




*Source: the authors.*

A reading of how the environmental concerns addressed by the scientific literature on SFM have changed over time shows that biodiversity holds a prime place, particularly in the early 2000s. However, our analyses showed (Part 3) that no biodiversity-specific management arrangement had been developed under SFM, unlike for example the "*carbon*" mechanisms, although these arrived later. To better understand this asymmetrical treatment of environmental concerns and what potential they had to translate into operational management arrangements, we undertook a deeper analysis of the precise content of papers on SFM that addressed the themes of biodiversity and conservation.

### 4.2.2. *Where does biodiversity conservation stand?*

About half the texts in our scientific corpus address the theme of biodiversity conservation. A detailed analysis was carried out on just under half of them (*i.e.* 230 papers).[72] Most often, this theme is dealt with by forestry journals (*Forest Ecology and Management, Bois et forêts des tropiques*), and to a lesser extent by generalist journals on conservation (*Biodiversity and Conservation, Conservation Biology, Biological Conservation*) and ecology (*Ecological Indicators, Journal of Applied Ecology*). This first observation shows that specialist "conservation" and "biodiversity" journals tend not to mobilise the SFM concept.

#### The forest areas concerned

A large proportion of the studies that address both SFM and biodiversity conservation have a clearly defined geographic scope, which is relatively local and specific to an ecological and social context. They focus mainly on South America (mostly Brazil and Mexico) (33%) then on Asia (21%) and then Africa (18%). Very few of them target a regional level or make cross-country comparisons.

Their main focus is on managed forests (31%; *cf.* Graph 10). One of their key messages is the recognition of the conservation potential of managed forests (Imai *et al.,* 2009), another being the comparison of different logging methods as, for example, the benefits of reduced-impact logging compared with other types of logging (Kammesheidt *et al.,* 2001*b*).

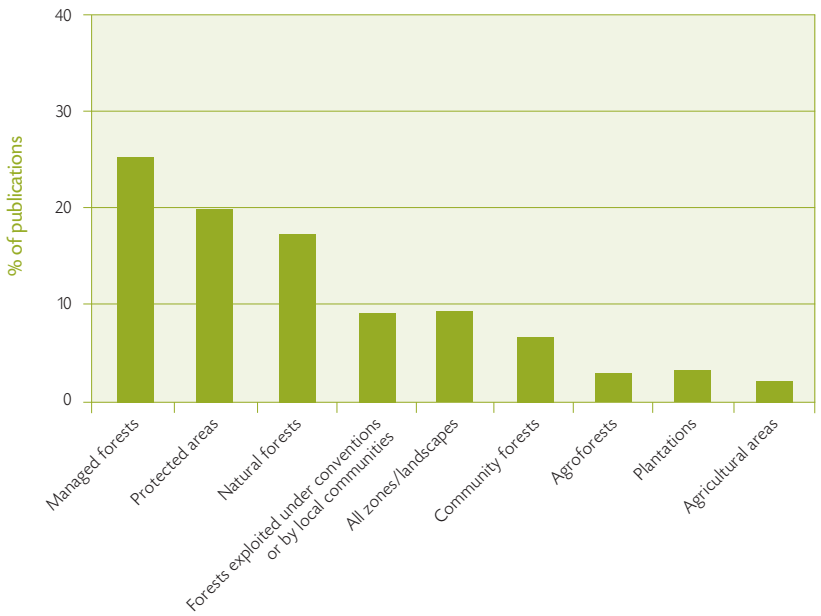
Protected areas also receive considerable coverage (25%; *cf.* Graph 10). The texts analysed particularly underline the drive to successfully reconcile local community needs with the regeneration capacities of ecosystems in areas generally under intense anthropogenic pressure (biosphere reserves, national parks, natural reserves). Consequently, these texts most often foreground the challenge of developing participatory management arrangements.

A supplementary analysis of all the available abstracts in our scientific corpus on SFM revealed that protected areas were very rarely cited overall. It is thus important to point out that "protected areas" are currently not associated with the SFM concept at academic level, a fact that our interviews confirmed. This is so, even though some people working in the field and more directly involved in protected area projects

[72] Out of the 1,361 scientific publications on SFM that made up part of our corpus, 535 references dealt with biodiversity conservation. 230 were available in digital form and thus facilitated our in-depth analysis.

(forest and non-forest) think that these areas should be perceived as part of SFM: "Protected areas are clearly among the tools for sustainable forest management" (CI interview).

Graph 10 *Areas referred to in scientific publications on SFM that address conservation and biodiversity topics*

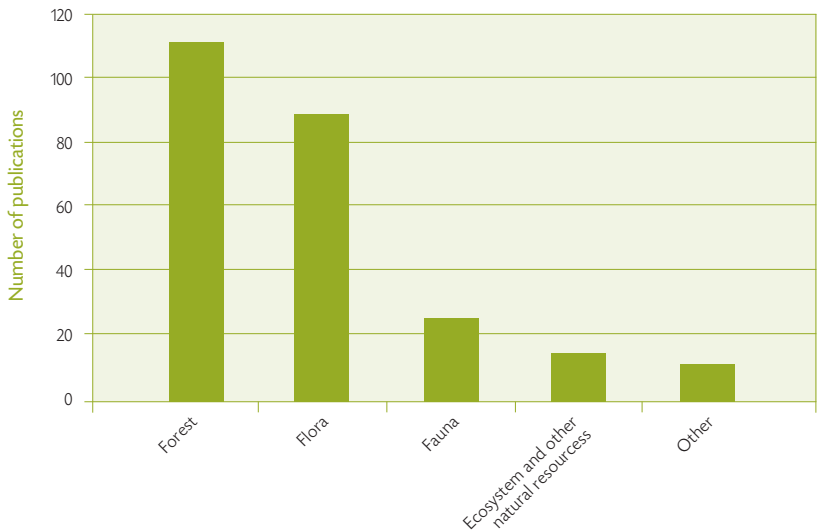



*Source: the authors.*

## What does SFM aim to conserve?

The approach proposed in this biodiversity conservation literature focuses primarily on forests as the general research topic, then flora. Fauna is very rarely addressed in the papers analysed (*cf.* Graph 11).

**Graph 11** *Research topics in scientific publications on SFM that address biodiversity conservation*




*Source: the authors.*

Although one might have expected to find specific treatment of topics that have hitherto received little attention (biodiversity, fauna, flora, water resources, soils, etc.), the "*conservation*" questions first and foremost involve maintaining the exploited wood resource, the stakes being to sustain timber production (Boltz *et al.,* 2001; Lagan *et al.,* 2007). The conclusion may sometimes be quite severe, pointing out that current planning and management measures are not able to ensure a sustainable level of harvesting for commercial species on an industrial scale (Sist & Ferreira, 2007; Zarin *et al.,* 2007). The main proposals on which there is a consensus advocate long rotation cycles (Kammesheidt *et al.,* 2001a) and reduced-impact logging methods (Carret, 2002; Krueger, 2004). These studies thus focus on the core issues of logging and its sustained yield.

The dynamics of forest stands and the effects of logging on plant biodiversity are, however, relatively poorly assessed (Lacerda & Nimmo, 2010). Plant forms, other than commercial species, receive no more attention in publications specifically targeting biodiversity issues than in the rest of the literature analysed: very few studies focus on undergrowth, lianas or epiphytes, except when the resources are used or marketed by local communities as NWFPs. In this case, studies target one or more species in order to define the threshold levels for sustainable logging.

Fauna is also little studied, with analyses mainly focussing on mammals, generally large flagship species (Meijaard *et al.,* 2006; Stokes *et al.,* 2010), bats (Presley *et al.,* 2008; Castro-Arellano *et al.,* 2009) and birds (Holbech, 2005; Danielsen *et al.*, 2010). Faunistic studies are almost all carried out on managed forests, the aim most often being to compare animal populations in sustainably managed forests with those in protected areas or unmanaged logged areas. Several authors also emphasise the fact that the number of protected areas is insufficient if they are to play an effective conservation role. They thus highlight the interest of also preserving wildlife in logged areas but generally without defining ecological limits for this management objective (excessive pressures, etc.) (Ancrenaz *et al.,* 2010). Ultimately, these studies remain fairly eclectic: for example, a study on insects to identify their role as an indicator of disturbances (Aguilar-Amuchastegui & Henebry, 2007; Akutsu *et al.,* 2007), but nothing on amphibians, which are nonetheless known to be highly sensitive to changes in environmental conditions. Moreover, hardly any publications deal simultaneously with wildlife and its habitat.

This analysis thus shows that the SFM literature certainly addresses the issue of biodiversity conservation quite frequently, but that this is treated as a secondary issue accompanying the central issue of logging.

The broader scientific sphere of conservation and ecology most often eludes the sphere of sustainable management. Some authors call for better coordination of research efforts between the two in order to produce concrete proposals to promote sustainable management (Deconchat & Balent, 2004; du Toit *et al.,* 2004), but seemingly research on the issues of biodiversity protection and conservation is still only very marginally addressed by SFM.

We will now look at how the regulatory frameworks institutionalising the SFM concept have or have not enabled better integration of forest-related environmental issues.

## 4.3. How are environmental issues managed by forest policy in tropical regions?

SFM seems to have driven various environmental improvements in the forest jurisdictions of tropical countries. After presenting these, we will go on to examine all of the criticisms levelled at them.

### 4.3.1. *Improving environmental standards in forest policy*

#### Integrating the dimension of forest ecosystems

The first point of interest involves changes in how forests are defined. The legislative reforms presented in Part 2 gave rise to new definitions of forest that propose a more ecological vision:

- "Forest means an ecological system consisting of the population of forest fauna and flora, forest microorganisms, forestland and other environmental factors" (Socialist Republic of Vietnam, 2004, Art. 3);
- "Forest is a precious natural resource of the nation and its specific ecology consists of biodiversity, water resources and forestland with various timber species growing naturally or planted in the protection forest zone, conservation forest areas and production forest areas" (Lao People's Democratic Republic, 2007, Art. 2).

This evolution gives reason to hope that greater attention will be paid to forest-related environmental questions in the management choices promoted. Forest policies have, moreover, integrated new tools to enhance knowledge about the sensitive resources of national forest estates, notably in order to take ecological balances into account more effectively: national forest inventories, management inventories and land-use plans:

- national forest inventories have been developed in view of balancing resource extraction and the vital need to protect the natural environment (République du Bénin, 1996; Republic of Indonesia, 1999; République du Congo, 2000; République gabonaise, 2001; Socialist Republic of Vietnam, 2004; République Togolaise, 2008);
- management inventories, a key requirement in management plans, are now widespread in most tropical countries, the main purpose being to list and map the resources of a defined logging area so that their extraction can be rationally planned;

- land-use plans, which are appended to the management inventory, make it possible to identify the ecologically sensitive zones in harvestable areas, which then automatically become listed areas where priority is given to conservation actions.

## Promulgation of environmental impact assessment

### Box 9 *Emergence and role of Environmental Impact Assessments*

The National Environmental Policy Act (NEPA) (USA, 1969), which came into force in the United States in 1970, was the first piece of legislation to require impact studies to be carried out so as to incorporate environmental concerns into the different levels of decision-making. Following the American example, some industrialised countries adopted similar systems to assess environmental impact (Canada, Australia and New Zealand in 1973 and 1974) (Sadler, 1996), whilst in Europe, France led the way with the adoption of the Nature Protection Act (République française, 1976).

At the international level, the assessment approach was explicitly described for the first time in the World Nature Charter adopted in 1982 by the United Nations General Assembly: "Activities which might have an impact on nature shall be controlled, and the best available technologies that minimize significant risks to nature or other adverse effects shall be used; in particular: (a) Activities which are likely to cause irreversible damage to nature shall be avoided; (b) Activities which are likely to pose a significant risk to nature shall be preceded by an exhaustive examination; their proponents shall demonstrate that expected benefits outweigh potential damage to nature, and where potential adverse effects are not fully understood, the activities should not proceed; (c) Activities which may disturb nature shall be preceded by assessment of their consequences, and environmental impact studies of development projects shall be conducted sufficiently in advance, and if they are to be undertaken, such activities shall be planned and carried out so as to minimize potential adverse effects" (United Nations, 1982, General Principle 11).

The 1992 Earth Summit fully enshrined environmental assessment raising it to the rank of a national instrument in Principle 17 of the Rio Declaration, and mentioned in various chapters of Agenda 21:[73] "Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority" (United Nations, 1992*c*, Principle 17).

•••

[73] The impact study is mentioned in twenty of the forty chapters of Agenda 21.

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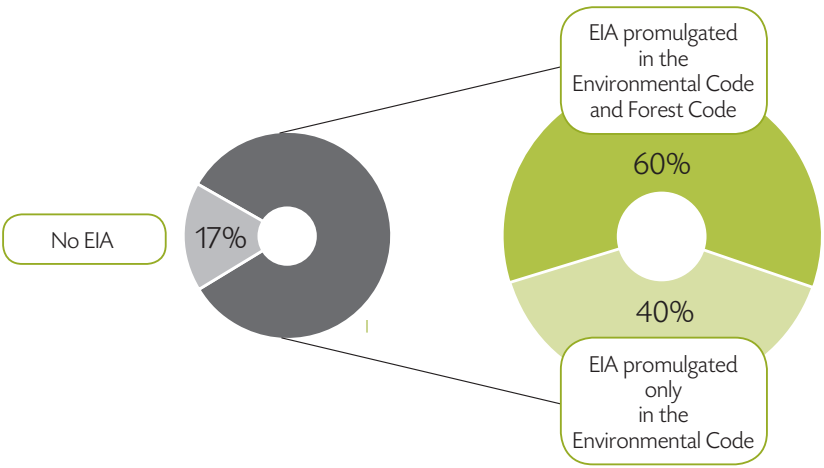
Several international agreements and conventions subsequently enriched this assessment process (André *et al.,* 1999). One example is Article 14 of the Convention on Biological Diversity (United Nations, 1993), which proposed introducing an environmental assessment system for projects likely to have an adverse impact on biological diversity; another is Article 17 of the Lomé Convention revised in 1995 (ACP, 1995), which provides a framework for an environmental assessment instrument geared to large-scale projects. References to this approach are also found in the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (UNECE, 1998) or the European Landscape Convention (Council of Europe, 2000).

Environmental Impact Assessment (EIA) is "a procedure used to examine the environmental consequences, both beneficial and adverse, of a proposed development project and to ensure that these consequences are taken into account in project design" (OECD, 1992, p.7). The principle of integrating EIAs into national jurisdictions laying down the Environment Code and/or Forest Code is another stride forward that followed on from the emergence of sustainable development and SFM, in line with the donors' requirements (*cf.* Box 10). The analysis of environmental and forest-related legal texts from 36 tropical countries [74] enabled us to establish (*cf.* Graph 12) that only 17% of the countries studied (6 countries) made no mention of EIA (either in their Environmental Code or Forest Code). It is mentioned by 83% (30 countries), 40% (12 countries) of whom mention it only in their Environmental Code and 60% (18 countries) in both their Environmental Code and Forest Code.

[74] The analysis was performed on legislative and regulatory texts relating to the environment and forests available for French-speaking and English-speaking countries from among the 56 countries identified in the second phase of this study. In all, 36 countries were studied: Benin, Bangladesh, Brunei Darussalam, Burundi, Cambodia, Cameroon, Central African Republic, Chad, China, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Gabon, Gambia, Ghana, Guinea, India, Indonesia, Laos, Liberia, Madagascar, Malaysia, Myanmar, Nigeria, Papua New Guinea, Philippines, Rwanda, Senegal, Sierra Leone, Sri Lanka, Tanzania, Thailand, Togo, Uganda, Vietnam, Zambia.

**Graph 12** *Promulgation of EIA in legal texts relating to the environment and forests in 36 tropical countries*




*Source: the authors.*

**Box 10** *The donors' influence on EIA*

On the whole, developing countries began to apply non-regulated EIA processes so as to comply with donor requirements, as funding was conditional on the carrying out of an EIA by the project or programme owners (André *et al.,* 1999). After some hesitation, the World Bank imposed EIA on all projects financed by the Global Environment Facility (GEF), and on all its sectoral projects and programmes except for structural adjustment programmes (World Bank, 1999). It was also the first international institution to establish a series of measures to ensure that the projects it funds are not harmful to the environment. This was then followed by many other donors.

- **World Bank:** "1) The Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. 2) EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence: examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts…" (World Bank, 1999, p.1).

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- **FAO:** "Environmental assessments analyze and evaluate potential environmental impacts of proposed projects, programmes and/or policies. They facilitate the improved planning, design and implementation of projects by providing for the systematic collection, analysis and transfer of relevant environmental information to decision-makers" (FAO, 1999, p.1).
- **African Development Bank:** "Assessment process followed to integrate environmental and social dimensions into the Bank's lending operations. This process relies on various instruments to carry out the assessment such as the Environmental and Social Impact Assessment and the Environmental and Social Management Plan" (AfDB, 2001, p.vi).
- **Asian Development Bank:** "Environmental assessment is the primary administrative tool to integrate environmental considerations into decision-making of all types of development initiatives such as formulating policies, programs, and development plans or projects to ensure that proposed development will have minimal environmental impacts and be environmentally sound" (ADB, 2003, p.5).
- **Inter-American Development Bank:** "All Bank-financed operations will be screened and classified according to their potential environmental impacts" (IADB, 2006, p.8).

## Strengthening forest-protection measures

States have also implemented, through their jurisdictions, three main types of provision intended to bolster protective measures for forest ecosystems.

### *Classification of forest estates to be protected and conservation objectives*

Classification of the national forest estate has enabled the setting up of forest areas that are not designated for extractive activities. Several countries have defined the management objectives for these areas and assigned *de facto* new environmental powers to the authorities responsible. "Production forests are intended to secure the maintenance of permanent forest cover in order to conserve fragile soils, water sources or waterways. Clear-cutting is prohibited, unless for phytosanitary needs. Natural conservation forests are intended to secure the sustainability of forest species, protect wildlife and plant habitats and preserve landscapes. These objectives are specified in the Classification Order that indicates the conservation measures to be taken. Exploitation of forest resources in these forests must comply with these objectives" (République du Congo, 2000, Art. 10). These protected areas are also identified for the purposes of protecting wildlife.

### *Containing some deforestation factors: forest clearance and control of forest fires*

The laws state that it is almost impossible to clear forestland if it belongs to the State forest domain. When this is possible (République centrafricaine, 1990; République du Congo, 2000; Socialist Republic of Vietnam, 2004; Republic of the Philippines, 2010), declassification is subject to strong conditionalities depending on the national contexts: "Declassification of forests in the State domain can only be carried out for reasons of public, economic or social interest, in the absence of other available areas" (République centrafricaine, 1990, Art. 68). It often requires a prior impact study and/or must be approved by a specialist committee (République du Congo, 2000) and, finally, may be accompanied by compulsory reforestation to offset the reduction in forest area (République togolaise, 2008). Many provisions on forest fire control also exist in national legislations (République gabonaise, 2001; République démocratique du Congo, 2002*b*; Kingdom of Cambodia, 2003a; Republic of the Philippines, 2010). As wildfires are considered to be a major threat, States have strengthened their control measures. Examples of proposed measures include ignition operations, fire belts and the involvement of local populations.

### *Defining protection and conservation measures in forest management plans*

The multifunctionality of forests is now integrated into forest planning objectives. The spaces to be protected are identified in land-use plans and designated in management plans as areas where logging is prohibited, known as conservation and protection series. These aspects are characteristic of the Congo Basin countries, where the concept of forest planning is the most advanced. Conservation and protection series include environments identified as sensitive (wetlands, valley bottoms, mountain forests with limited access) as well as areas used as "sample" environments prior to logging operations (ATIBT, 2005*b*).

Some cross-cutting standards are also proposed via management plans in order to "minimise the impacts of logging on the environment" (République du Cameroun, 2001, Art. 11[2]), such as the protection of river banks and water bodies, protection of water quality, wildlife protection and controls over hunting, the location, construction and improvements of forest roads, management of camps and industrial facilities, the setting up of timber yards, the wearing of safety gear, management of personnel and related beneficiaries (hygiene, education, health, etc.), waste processing, etc. (ATIBT, 2007).

Yet, despite these environment-friendly advances, diverse but often interrelated critiques have been raised concerning the real capacity of essentially legal mechanisms to address to environmental issues effectively.

### 4.3.2. *Critiques and determinants of the limited integration of environmental issues*

#### Standards centred on logging

Although some definitions of forest have incorporated a more ecological approach to ecosystems (*cf.* infra), this trend seems more pronounced in Asia than elsewhere. In Africa, the definition of forest often remains utilitarian:

- "Within the meaning of the present law, forests are considered to be lands with a vegetation cover in which trees, shrubs and other species likely to provide products other than agricultural products are predominant" (République du Cameroun, 1994, Art. 2);
- "Within the meaning of the present law, it is understood that... forests are all areas having a vegetation cover able to provide wood or plant products other than agricultural products, to shelter wildlife and to exert a direct or indirect effect on the soil, the climate or the water regime" (République gabonaise, 2001, Art. 4).

Forest legislation in Congo Basin countries thus sets priority on providing legal frameworks for timber-producing forests (Nguiffo, 2008), which gives rise to various processes that are unfavourable to the integration of environmental issues. For instance, an industrial logging concessionary may be given three years on average to produce a management plan. During this time, the company is entitled to begin logging without any obligation to respect the provisions of the management plan (IDDRI, WWF and MAP interviews) and it is not rare to see concessionaries abandon their concessions after three years of non-managed timber extraction without any action being taken against them (IDDRI and ATIBT-IFIA interviews). Interestingly enough, from a social point of view, community management is generally subject to more stringent management modalities than those required of private loggers (République du Cameroun, 1994).

The national legislation of Congo Basin countries also tends to side-line NWFPs, since the laws do not as a rule provide for any mechanism for developing these products commercially (République du Cameroun, 1994; Democratic Republic of the Congo, 2002*b*). This is yet another factor that disadvantages the environment. Several studies have shown that the production or exploitation of NWFPs frequently relies on management rationales that are more respectful and friendly to forest biodiversity than those focussing exclusively on wood products (Gautam & Watanabe, 2002; Ambrose-Oji, 2003; Lawrence, 2003; Gubbi & MacMillan, 2008).

Turning more specifically to biodiversity and wildlife management in the Congo Basin countries, the legal provisions seem meagre and unclear (République du Congo, 2000). When they exist, their purpose is most often to regulate hunting rights. The standards proposed are generally uniform across the whole of the national territory (République centrafricaine, 1990; République du Cameroun, 1994; République du Congo, 2000), despite the fact the diverse ecosystems may coexist. These standards have seemingly been justified more on the grounds of vested interests and the regulation of hunting than on any real long-term management of wildlife conservation (Nguiffo, 2008).

These weaknesses, characteristic of the Congo Basin, are in need of adjustment, if one considers Asia, for example, which attaches more importance to NWFPs and makes more comprehensive provision for fauna often by banning hunting and securing wildlife conservation (Kingdom of Cambodia, 2003*a*; Socialist Republic of Vietnam, 2004).

## Lack of implementing decrees

A further critique found in the literature targets the failure to follow through the law-making process. Generally speaking, although forest policy reforms have indeed made it possible to produce sound legislation in tropical countries, some of these still need to make a huge effort to regulate their implementation (even though our study shows that, at the international level, standard-setting activity has not been limited to producing laws and that, in recent decades, many countries have developed rule-making activities to drive the implementation of forest-related reforms). The 1994 Cameroonian law, for example, cites 137 referrals to texts and implementing decrees that, in 2008, had still not been formulated (Nguiffo, 2008).

The lack of political will to follow through is often challenged. Yet, many also point out that the government administrations lack financial, human and managerial resources (Blaser, 2010), particularly in Africa (Buttoud, 2001*b*; Yasmi *et al.,* 2010).

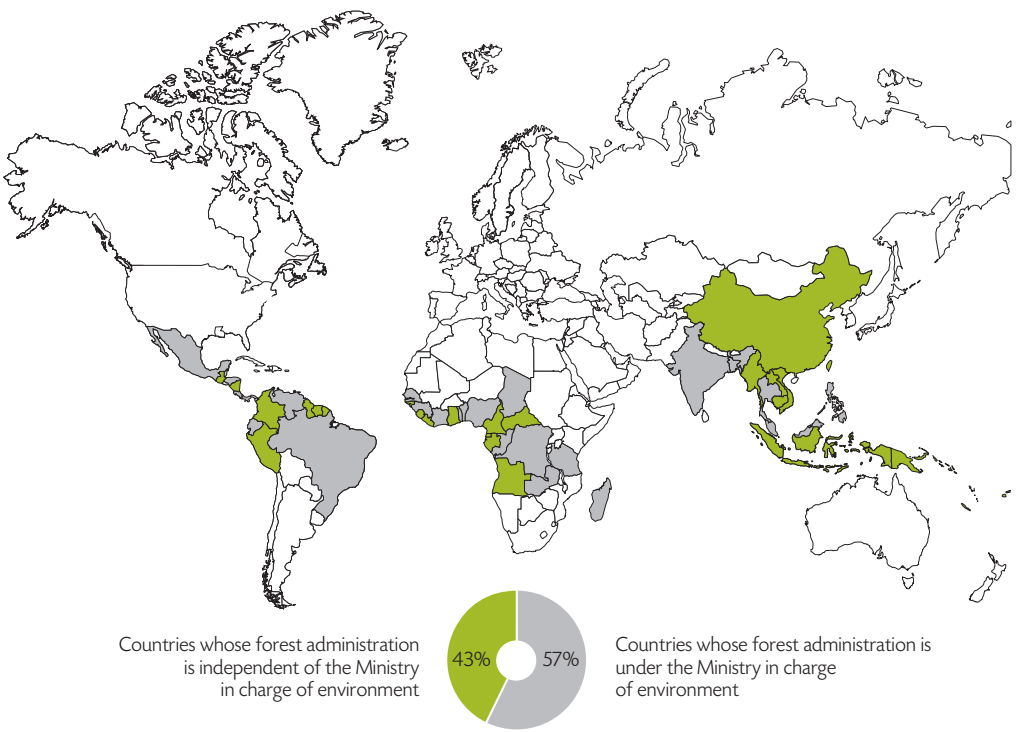
## A complex institutional system and a lack of resources

The complex structure of the administrative systems in charge of environmental and forest affairs is often identified as one of the impediments to effectively integrating forest-related environmental issues.

At global level, administrative operations are run on two predominant models (*cf.* Map 8):

- in 57% of tropical countries, forest matters are dealt with by a dedicated service or administration of a ministry that has overall responsibility for the environment (Forestry Department, etc.);
- in 43% of tropical countries, several separate ministries each dealt with forest issues (Ministry of Environment, Ministry of Agriculture, Ministry of Forests, etc.).

**Map 8** *Mapping the different administrative systems in charge of forest affairs*




*Source: the authors.*

Although the first case might indicate an organisational structure that is more conducive to integrating forest-related environmental concerns and thus to improving dialogue between the forestry sector and the environment, this point needs analysing in greater detail. Similarly, the implications of the second model also need further study: does it increase mobilisation of state resources for forest matters? And are these used for the production function or protection? Moreover, apart from these two prevailing organisational models, there is also some degree of diversity in how roles are shared between environmental departments and forest departments:

- in some cases, the administration in charge of forests is responsible for environmental matters in production forests, whereas the administration in charge of environment has the same scope of responsibility for protected forests (Kingdom of Cambodia, 2003*a*);
- in other cases, the forest administration has sole responsibility for all environmental issues across all forests (République du Cameroun, 1994);
- yet, other cases, cooperation between the different administrations is promoted to deal with environmental issues in forest areas (Socialist Republic of Vietnam, 2004).

The phase of legislative reform driven by international cooperation and donors implied having the financial resources necessary for institution- and administration-building in the forestry sector. However, in reality, these resources have sharply declined over the years. (Manning, 2004). Donors had counted on the fact that reform would bring greater coherence to the forestry sector and thus generate ongoing funding to cover the running of the related administrations, but the current state of resources shows that has not been the case.

Ultimately, forests often come under a dual jurisdiction, which is a major source of confusion. Forests can be dealt with under the umbrella of an environment code as well as a forest code. In any event, and however sound the legal texts, these different factors lead to a lack of environmental leadership on forest issues.

## Environmental impact studies are not undertaken, poorly managed or little used

Even though most countries have incorporated EIA into their national legal framework, some have not yet adopted this measure (6 countries out of the 36 studied).

However, for the thirty countries that have officially done so, the definition of EIA and its legal and institutional framework are for the most part very vague (*cf.* Box 11 and Appendix 2):

- only 33% of the 30 countries (10 countries) provide a precise legal framework for EIA: the legal text gives a precise list of activities subject to EIA, and indicates the thresholds, by type of activity, over which EIA is mandatory. The activities proposed can be grouped thematically: industrial and mining activities, logging, logging concessions, management plan, conversion of forestland for agriculture, reforestation/deforestation project, classification/declassification of forests and protected areas, forest plantations, management of forest areas in water catchment basins and/or bordering protected areas, trade, exchanges and introduction of species, etc.;
- 43% of the 30 countries (13 countries) have an imprecise framework: the text indeed defines a list of activities subject to EIA but sets no threshold level or limit over which EIA is mandatory;
- for the remaining 24% (7 countries), the framework for EIA seems very vague: the text mentions EIA but fails to list the activities subject to this assessment. Very often, the text specifies that the list will be covered by specific regulations, but we found that these are still non-existent.

## Box 11 *Different types of legal framework for EIA*

**Examples of legal frameworks for EIA**

The legal underpinning of EIA is recent in the Forest Codes and Environment Codes of tropical countries. In each country, it entails defining EIA and setting the framework for its implementation. The framework and scope of EIA differ substantially across countries. We will illustrate this with two contrasted examples.

**Togo, a precise and detailed framework**

Decree No. 2006-058/PR "setting the list of works, activities and planning documents subject to environmental impact assessment and the main rules for this assessment" presents the regulatory provisions for implementing EIA in Togo. Two types of EIA are defined and proposed according to the threshold for application: simplified EIA (SEIA) or full EIA (FEIA). A list of themed activities is proposed with thresholds fixed for each.

***Forestry:***

- reforesting operations and/or silvicultural treatment:
  > 10 ha and < 50 ha SEIA; over this limit FEIA;
- wetland or mangrove development: SEIA mandatory, FEIA not applicable;
- all logging activities:
  > 10 ha and < 50 ha SEIA; over this limit FEIA.

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***Biodiversity:***

- creation of collective or private communal parks and reserves: > 5 ha and < 100 ha SEIA; over this limit FEIA;
- capture and sale of animal species for export: SEIA mandatory; FEIA not applicable;
- introduction of new animal or plant species and GMOs: SEIA not applicable; FEIA mandatory;
- harvesting and/or hunting and sale of species never marketed previously: SEIA not applicable; FEIA mandatory;
- re-introduction of species in a zone where they had previously been located: SEIA mandatory, FEIA not applicable;
- introduction of exotic species into the territory but not present in the zone of introduction: SEIA mandatory, FEIA not applicable;
- bioprospecting activities: SEIA mandatory, FEIA not applicable;
- creation of parks, protected areas, land and marine reserves or zoological gardens on a national or regional scale: > 5 ha and < 100 ha SEIA; over this limit FEIA.

**The Philippines, an imprecise framework**

The 1978 Presidential Decree no. 1586 establishing an environmental impact statement system presents the provisions for setting up EIA in the Philippines. The EIA system was promulgated together with a list of activities subject to EIA. However, no limits and thresholds have been set to determine EIA applicability. Forestry projects, logging, major wood processing projects, the introduction of exotic animals into public or private forests, forest occupancy, removal of mangrove products are designated as activities requiring the completion of an EIA.

In addition to the shortcomings of some texts, the bibliographic analysis and the information collected during our interviews highlight the fact that EIAs are still rarely carried out, even in those countries where they are legally required. Several factors may impede the enforcement of the measures set out in the legal texts: a country's political and socio-economic instability, the scarcity of human and financial resources, the lack of interest for environmental issues as well as a shortage of qualified staff and technical means (Almeida, 2001). It may also happen that the creation of the EIA-dedicated structures provided for in the texts is delayed or revoked. Finally, in some cases, responsibility for EIA is split between the environmental and forest authorities, reflecting the dichotomy between their two supervisory ministries.

Despite these shortcomings, EIAs are nonetheless carried out in the forestry sector. The methodological principles applied to this sector resemble the general theoretical principles of EIA (*cf.* for example, André *et al.,* 1999; *cf.* Table 14).

**Table 14** *Phases and methodological steps of the EIA process*

| Implementation phases | Description |
|---|---|
| **Pre-field phase** | |
| Preliminary analysis | Meeting with the project proponent and exploratory site visit |
| Desktop study | Analysis of available bibliographic data and other material |
| **Field mission** | |
| Interviews | Interviews with resource persons |
| Consultation | Public consultation based on the participation of local stakeholders |
| Data collection | Collection of field data: physical and biological inventory, socio-economic analysis |
| **Post-field phase** | |
| Reporting | Drafting of the official EIA report with:<br>• review of the context, objectives and methodology used<br>• description of historical and socio-political contexts, notably from the environmental point of view<br>• review of the legal and institutional context<br>• description of the project *in situ*<br>• description of the baseline environmental conditions<br>• description of the results of the public consultation<br>• analysis of the environmental impacts and proposal for mitigation and compensation measures |

*Source: the authors.*

Although EIA methodology seems to be rigorous, some authors consider that it still has weaknesses that need to be firmed up (Almeida, 2001; Rainbow Environment Consult, 2010). For example, André *et al.* (1999) insist that EIAs should pay systematic attention to indirect, cumulative or residual impacts (*cf.* Table 15) and try to respond to these effectively. The forestry sector EIA reports that we were able to access for the purposes of this study clearly suffer from such methodological shortcomings (JMN Consultant SARL, 2004*a* and *b*; ESSEM, 2008). Furthermore, the actual usefulness of EIA is sometimes queried: "*The limits, it's simply knowing afterwards what it's used*

*for? Many things are done because they are required but, in the end, no one uses the results. You do a lot of things, you show that you are doing a lot of things, but ultimately companies are still loggers, that's clear"* (ONFI interview).

**Table 15** *Typology of effects to be assessed during an EIA*

| | |
|---|---|
| Direct effect | Expresses a cause-effect relationship between a project component and an environmental component. |
| Indirect effect | Results from a direct effect and follows on in a chain of consequences. |
| Cumulative effect | Results from a combination of effects generated by the same project or several projects in time (past, present or future) and in space. |
| Residual effect | An effect that remains after a mitigation measure has been applied. |

*Source: based on André* et al. *(1999).*

## Illegal logging

Among the causes of deforestation and ecosystem degradation, illegal logging plays a major role (FAO & ITTO, 2005). Here, we will examine the role of the legal texts, the administrations and the effectiveness of legal measures to combat the illegal logging; which we presented in Part 2 of this study.

### *Institutional failings*

The administrations' lack of resources, the inconsistencies between multiple national jurisdictions (Environment Code vs. Forest Code) and the emergence of a host of legal constraints on the timber resource (taxes, limits or ban on timber removal, strict control of commercial activities, etc.) are all cited as determinants of illegal logging (Blaser, 2010; Yasmi *et al.,* 2010).

In some countries, the actual legitimacy of the legislation has been challenged on the grounds that they were drafted by foreign consultants using a top-down approach: the questions of land tenure, resource management and local community rights of use have thus been addressed with no deep understanding of the historic, cultural and customary practices of forest peoples (Kern *et al.,* 1999).

Apart from these factors, corruption in state administrations is also identified as a major problem. In some countries, it seems to affect all levels and all sectors of the timber industry in the tropical basins (Bourguignon, 2006; Amacher *et al.,* 2012) (FUSAGx interview). Corrupt practices are effective as they are able to respond to

the diverse needs and interests more rapidly than conventional systems (MAP interview). At local level, the lack of transparency, the authorities' inadequate means of control, power struggles, economic disparities and the marginalisation of local stakeholders in decision-making processes have led to a growing indifference to compliance with standards, which has exacerbated the trend towards illegal practices (Nguiffo, 2008). Moreover, the centralised hierarchical system, low salaries and the forest officials' lack of training and knowledge about the local context may encourage them to take the proceeds from informal contracts with much higher paid industrialists rather than enforce the law (MAP interview). This means that the effectiveness of the administration is greatly hampered by corruption: "It's always said that the administration is sovereign in its own country, which is true, however corrupt it may be" (FUSAGx and MAP interviews).

The literature also mentions the problems of monitoring the state of ecosystems. Although a planning and land zoning strategy is implemented in some countries, there are many persistent gaps in the knowledge of available resources in the logging areas (FAO & ITTO, 2005). The lack of accurate information on the legal status of the logging areas and the corresponding forest estates, the quantities and types of resources extracted, and the commercial flows of timber and other products make the control systems less effective and encourage the spread of illegal activities.

Faced with large-scale illegal logging, which in recent years has been encouraged by the growing demand for timber products, the international community [75] has turned to the implementation of new, bilaterally negotiated, voluntary partnership agreements (Cerutti & Lescuyer, 2011; ITTO, 2009). This is the case of the FLEGT, described earlier in Part 2. In the following sections, we will examine how effective this is from an environmental point of view.

### *How environmentally effective is the FLEGT?*

Despite the shortcomings of the legal and regulatory texts, a good many actors think that law enforcement would go a long way to resolving the issue of deforestation. "Concretely, forest codes are mostly good, so what's legal is mostly sustainable. Well…what's not sustainable tends to be illegal" (MAEE interview). "In most cases, the laws and regulations are already relatively adequate. They could be improved at the margin, but overall they bring some major advances and so if these rules could just be enforced then I think that this would be a great stride forward" (World Bank

[75] We understand "international community" to mean all of the institutions (NGOs, IGOs, donors, members of the development and scientific community) that are working within the framework of tropical forest management.

interview). The FLEGT, whose primary objective is law enforcement, thus represents a key tool for the interviewees: "The FLEGT is important. It outstrips everything else" (ATIBT-IFIA interview).

For some NGOs, the FLEGT holds promise for environmental issues as the actors who commit to this mechanism (States and not logging companies or timber buyers) have no direct economic interest in the timber trade: "the FLEGT is robust as with State control and the European Commission behind it, there is no direct financial link between the person certified and the certifier" (FNE interview). Several environmental ONGs support this initiative: "the FLEGT, it's us... France's public policy for the purchase of timber, we are behind it" (WWF France interview).

Moreover, the industry actors also recognise that participating in the FLEGT process is to their advantage insofar as the sanctions are also and above all applicable to the downstream value chain: "It's the importers who insist on the FLEGT, as they are the first to be penalised, and so the industry has also joined in" (Rougier interview).

Although the FLEGT seems to rouse expectations and enthusiasm, it has also come under some criticism. One critique denounces the still over-timid approach to innovation: for example, the range of products covered by the FLEGT is judged to be too limited: "For the products involved: it was rather limited and, as a result, due to lobbying by book publishers, printed material is not covered by the regulation. Neither is recycled material." (FNE interview). Under the FLEGT the range of products involved can be extended through voluntary partnership agreements but these depend on voluntary initiatives. This becomes a key issue when considering the quantities of wood used for the paper pulp industry. This is the case, for instance, of large wood-producing and wood-exporting countries, such as China and Brazil. If the range of products subject to FLEGT is extended, this also means that they can boost a large part of their production thanks to their entry onto the European market.

More generally, the critiques target the traceability system, which is judged to be minimalist: "compared to total traceability: there is minimal traceability" (FNE interview). The fact that VPAs are concluded through bilateral and voluntary negotiations make them particularly vulnerable to evasion: illegal products can simply be rerouted into Europe *via* other non-signatory countries. Today, the wood industry supply chains are becoming increasingly complex and this makes it difficult to monitor traceability. Timber can be logged intensively in one country, then processed in another before being exported to its final destination: "FLEGT, we're not sure that this is a good tool, because all the wood from doubtful sources will go to less demanding markets, like in Asia" (MAP interview). This critique has gained much ground in recent years as the

demand for wood products in the major wood-processing countries (Brazil, China) is increasing, and none of them have signed a VPA.

Thus, although forest regulations appear to be designed to respond to the sustainable development concept, as we have just shown, they still have many shortcomings, which explains their limited role with respect to the effective integration of forest-related environmental issues. What, therefore, is the situation regarding the three main types of management arrangements implemented in the name of SFM?

## 4.4. To what extent are environmental issues integrated into forest management arrangements?

We now turn to the different forest management arrangements identified earlier to examine their strengths and limits in light of the expectation that SFM is able to foster the integration of forest-related environmental issues.

### 4.4.1. *Arrangements aimed at improving logging practices: how environmentally effective are they?*

#### Sustainable forest planning

Many authors and interviewees concur that SFP is an important solution for the protection of tropical forests.

One of the arguments advanced hinges on the fact that it is in the loggers' interest to work with sustainable management plans as planning enables them to optimise their practices financially: in the short run, by lowering the costs of timber harvesting (through better knowledge of the resource, optimisation of the road network, etc.; *cf.* ONFI and MAP interviews; Karsenty & Nasi, 2004); and in the long run, by ensuring resource regeneration (Rougier interview). By adopting this approach, they can also create a positive corporate image in the minds of buyers, which tends to boost their product sales (WWF-France interview).

From a wider angle, the main argument put forward relates to the fact that SFP allows loggers to keep their business profitable and thus avoids the conversion of forestland to other uses (Walker & Smith, 1993; Fargeot *et al.,* 2004).

Some research, such as the recent study by Putz *et al.* (2012), has focussed more specifically on the impact of logging on carbon stocks and biodiversity. With respect to biodiversity, while recognising the difficulties of conducting reliable studies in this field, Putz *et al.* (2012, p.3) present some of their findings: "a meta-analysis based on

109 studies of selective logging of primary tropical forest carried out 1–100 years after a single harvest r.evealed modest impacts on species richness of birds, mammals, invertebrates and plants". According to the authors, "with their high biodiversity, carbon, and other environmental values, well-managed tropical forests represent a 'middle way' between deforestation and total forest protection" (Putz *et al.,* 2012, p.5).

Thus for some, sustainable planning is a very direct means of protecting forests and their environmental value, and even stands as an environmental standard that effectively integrates the three pillars of sustainable development (Carret, 2002; Samyn *et al.,* 2011).

Mixed critiques are nonetheless voiced contradicting these claims. Some authors first of all point out that, in the vast majority of cases, logging practices continue to operate on a "conventional" or "classical" model, with no planned extraction or real concern for regeneration of the resource (Guéneau, 2011), which in itself, after twenty years of sustainable management, could be perceived as a failure. Some even challenge the idea that the logging industry should take environmental and social concerns on board. In their opinion, this would be asking loggers to go beyond their role and fill in the gaps left by the States' shortcomings (SFDIC and ATIBT-IFIA interviews). For others, sustainable forest management remains a kind of necessary evil, as the FAO (1994*a*, Chap. 5) suggests when it points out, while still supporting the system, that "Management intervention in a forest, however, no matter how carefully or lightly carried out, inevitably alters the structure and ecology more quickly and in different directions than a policy of preservation". Again, one logging company (Rougier interview) underlines that "talking of sustainable management is a little presumptuous", and prefers to communicate on "*responsible*" rather than "*sustainable*" management.

More precise critiques target the profitability of sustainable forest planning schemes. Niesten and Rice (2004) argue that the financial return on investment for logging activities managed through sustainable planning is lower than direct harvesting, which is not likely to encourage loggers to implement sustainable planning practices. Some authors confirm these observations: "The most financially profitable option is to extract all the profit-generating timber as quickly as possible and then either abandon the area or convert it to soybean fields, oil palm or pulpwood plantations, or cattle ranches" (Putz *et al.,* 2012, p.5; see also Pearce *et al.,* 2003; Fisher *et al.,* 2011; Ruslandi *et al.,* 2011; Persson, 2012). The "*economic sustainability*" of this system is also strongly challenged by some economists and foresters because *(i)* very large trees logged from the first cut are the result of several centuries of silvigenesis and thus cannot be replaced in the space of a cutting cycle (Valeix, 1999) and *(ii)* the volume extracted

(over and above the very large trees) is too big to allow for forest regeneration during the rotation period (Karsenty & Gourlet-Fleury, 2006) and at the same time too small to allow for the regeneration of light-loving species, which are for the most part commercial species (Fredericksen & Putz, 2003; Karsenty & Gourlet-Fleury, 2006; Nasi & Frost, 2009).

Various authors also show that sustainable planning is responsible for a major disturbance of the ecosystem (Niesten & Rice, 2004). The scientific literature reports significant impacts in terms of biodiversity (Frumhoff, 1995; Bawa & Seidler, 1998; Niesten & Rice, 2004) and disturbances that can lead to the destruction of forest cover, such as forest fires or land-use changes (Chazdon, 2003). With respect to the methodology used to design the management plans, we observed that only a limited number of environmental components are taken into account: firstly, commercial timber species and then plant species that provide NWFPs important for local communities. In both cases, priority is given to species with an immediate economic or socio-economic interest. When these management plans address the question of wildlife, it is primarily the large flagship fauna that are targeted. Insects, birds, bats and other mammals, whose role is nonetheless very often essential to the functioning of these ecosystems, are not taken into account (Holbech, 2005; Meijaard *et al.,* 2006; Castro-Arellano *et al.,* 2009; Presley *et al.,* 2009; Danielsen *et al.,* 2010; Stokes *et al.,* 2010). On the whole, the impacts of sustainable forest planning on the structure and functioning of ecosystems are complicated to assess and the need for research on this topic is pointed up by a good number of experts (SFDIC and Rougier interviews).

Finally, the considerable gap between what is planned in the sustainable management plan and what is actually implemented on the ground is very often a subject of debate. One forest planner from a consulting firm recognises that many data are collected during the management inventory, mainly to meet regulatory requirements, but that these data are not sufficiently exploited in view of limiting environmental impacts (ONFI interview). Governance problems are also recurrent: firstly there is not only a lack of resources in forest administrations for verifying the implementation of these plans, but also problems linked to corruption: "It's the concessionaries who pay for the petrol for the forest administration vehicles". "You could see cases full of banknotes being exchanged: getting a felling authorisation stamped is expensive" (SFDIC and MAP interviews).

Several limitations to the sustainable forest planning model are thus regularly mentioned, even though this system is still being promoted. In fact, two ways of thinking are at odds: an optimistic view affirming that the concept – although it still needs improving – fosters an interesting management method that is effectively close to

SFM ("forest planning is better than no planning" CIFOR interview) and a pessimistic view which considers that this management arrangement is still too complex, difficult to implement and relatively unsuitable for more widespread application (Samyn *et al.,* 2011). It would be "neither financially attractive... nor ecologically satisfying" (Niesten & Rice, 2004), which prompts these authors to advocate alternative models that promote forest ecosystem conservation such as post-harvesting measures and conservation concessions.

## Reduced-Impact Logging (RIL)

As shown in Part 3, sustainable forest planning and RIL cover very similar practices. RIL nonetheless targets the direct environmental impacts of the logging phase and attempts to remedy these. When the recommended measures are correctly implemented, there appears to be reduced impact on forest cover and soils (Putz *et al.,* 2008). ITTO (2001), however, remains dubious as to the extent of this impact reduction and the acceptability of residual impacts. Overall, the environmental effectiveness of RIL has limits that are very similar to those of sustainable planning: the extra cost of implementing such practices (Putz *et al.,* 2000; Abdul Rahim *et al.,* 2009) and the difficulty – or even impossibility – of reconstituting timber stocks between two fellings (Putz *et al.,* 2008). Greenpeace (2009) has also questioned RIL, and more generally sustainable forest planning, for its role in reducing carbon storage in forest ecosystems.

## Certification

Voluntary certification schemes involve some degree of innovation in that their stated priority is to give more weight to social and environmental aspects. For some forestry actors, the PC&I underpinning certification seem reliable and able to guarantee the sustainable management of forests (Karsenty *et al.,* 2004). Like the previously mentioned arrangements that all hinge on "improving logging practice", the idea here is again to show that by increasing the profitability of logging (this time through labels, corporate image, niche markets, etc.), certification ensures long-run forest conservation: "in our choices of certification, the economic aspect certainly comes a little to the front in the sense that, if we aren't profitable, we won't be here tomorrow, and if we aren't here tomorrow, we can't ensure responsible management" (Rougier interview). The challenge for the advocates of certification is thus to show the economic actors that certification, in addition to its environmental virtues, also brings financial added value and facilitates market access. "Our challenge, is to demonstrate economically that certification is worthwhile for their frame of reference, which is an economic one" (ONFI interview); " Afterwards, we have to spread the

word to help others become certified. We usually say that certification can bring in 20 to 25% of the concession's turnover" (ATIBT-IFIA interview).

Some think that the system's flexibility provides a better response to environmental issues, especially when compared to legal instruments, which take a long time to define and implement: "If you don't know how to put the key principles of sustainability into action on the ground, you can't do anything. Here, with certification, we've made things concrete, palpable" (WWF-Belgique interview).

However, certification is by no means immune from criticism. Some authors point out that the market follows consumer demand (Hansmann *et al.*, 2006; Mione *et al.,* 2009), and is thus particularly vulnerable to fluctuations. As a result, hopes of increasing the uptake of certification on account of its economic returns can easily be challenged. Moreover, while large logging companies can absorb the extra costs linked to certification, the question is more complicated for small-scale operators in developing countries (Auld *et al.,* 2008): "The problem is that certification is expensive and that excludes small local loggers" (ATIBT-IFIA interview). The voluntary approach also raises questions for some authors (Kouna Eloundou *et al.,* 2008; Tsayem Demaze, 2008). It in fact allows loggers to disengage rapidly from their commitments in the event of market fluctuations and return to more environment-unfriendly practices, which undermines the notion of sustainability.

For other actors, certification C&I still fail to adequately address environmental issues (Berenger *et al.*, 2001; Gullison, 2003; Guéneau, 2011). "You can see obvious shortcomings in some certification schemes: for example, the issue of using GMO trees in the Brazilian or Chilean schemes, the lack of credibility regarding the question of sustainable management of the Malaysian scheme, the lack of criteria on fauna and flora in PEFC,..." (St-Gobain interview; Gullison, 2003). PEFC comes under heavy criticism notably for its weak environmental criteria. It should be mentioned that, in Malaysia, where deforestation problems due to clearance for farming are the most worrying, the Malaysian Timber Certification Council (MTCC), which takes PEFC PC&I as its reference, explicitly authorises the conversion of secondary forests: "We still have difficulties with non-conversion of forests, because PEFC recognises that primary forests are not to be converted, yet it authorises the conversion of secondary forests to plantations, which poses a problem in the regions of Southeast Asia" (FNE interview). Lastly, some highlight the possible gap between certification and on-the-ground verification. They fear that certification may replace regulatory mechanisms: "we don't want certified timber to be seen as legal... because certification systems on paper look fine... but the paper isn't the problem, it's putting it into application" (FNE interview).

### 4.4.2. *Arrangements for enhancing carbon stocks: how environmentally effective are they?*

#### CDM

Although the CDM process does include environmental protection clauses (Tsayem Demaze, 2010*b*), it is nonetheless subject to diverse criticisms. It should be remembered that in the tropical zone, CDM only covers afforestation-reforestation projects. On this count, some critics contend that this is likely to foster industrial plantations of fast-growing exotic species, whilst forest goods and services other than carbon storage are ignored (Smith *et al.,* 2000). These plantations, especially eucalyptus plantations, could thus degrade the environment (soil and aquifers, increased exposure to pathogens) and reduce biodiversity (Boulier & Simon, 2010). Finally, some think that countries may be discouraged from implementing hard environmental policies as this might make some types of projects ineligible for CDM, given that their additionality could no longer be demonstrated (Lecocq & Ambrosi, 2007).

#### REDD+

Today, there is very little consensus on the environmental aspect of the REDD+ mechanism. Some view it as a means of globally integrating the environmental threats to forests "not only in terms of mitigating the greenhouse effect, but also at the ecological level more generally" (MAEE interview). They consider that the mechanism encourage the actors of sustainable management to redefine their practices. Neeff (2008), [76] for instance, considers that REDD finance has the potential to "halt the economic logic leading to the conversion of Brazil's Amazon forest to pastureland."

On the other hand, some critiques, such as those described by Bernard *et al.* (2012), hold that the environmental effectiveness of REDD+ raises various questions, which we will we take up here. First of all, there is little consensus on REDD+ effectiveness with respect to climate change: does it produce real reductions in GHG emissions? Will REDD+ really ease the pressure on forests, given the forcefulness of the underlying drivers of deforestation – which are buoyed by the high demand for commodities (timber, soya, palm oil, meat) and sustained by severe political and regulatory failings? Moreover, the inclusion of forest management and reforestation activities under the "+" calls into question the priority given to the fight against the deforestation of existing natural forests, which has now become simply one way among others of maintaining or increasing forest carbon stocks. Similarly, as these reforestation and

[76] Cited by Tsayem Demaze (2010*a*). Translator's translation.

SFM activities are not clearly defined (as we pointed out in Part 3), there is no real guarantee that they will not harm biodiversity, or even that, indirectly, they will not drive the conversion of natural forests (Secretariat of the CBD, 2009; Thompson *et al.,* 2009). In addition, even if forest conservation is to be effectively upheld as a key objective, all forest zones are not equivalent from an environmental viewpoint – unlike the tonnes of sequestered carbon, which have the same effect on the climate regardless of the locality in which their emission has been avoided. The question of biodiversity is once again greatly underestimated. For example, some zones such as hotspots or "intact forests" may have a high ecological value, whereas other forests may be less biodiversity-rich. The choice of zones integrated into the REDD+ mechanism will thus greatly affect the overall environmental performance (Karousakis, 2007). Finally, the vagueness of the final definition of "forest" retained for the future REDD+ and the debates on how the baseline scenarios are to be defined currently seem to be grey areas that could potentially reduce the process's environmental effectiveness. REDD+ could thus result in the "*worst performers*" being rewarded (Karsenty, 2010; Seymour & Forwand, 2010) if the emission reduction accounting were to be based on past levels of deforestation and degradation.

These concerns, as well as others relating to social questions and the rights of local populations, have led the Parties to the Climate Convention to adopt environmental and social safeguard clauses annexed to the Cancun Agreement (UNFCCC, 2011). The purpose of these safeguards, which are nonetheless non-binding, is to prevent the adverse effects (social and environmental) that some REDD+ activities may induce. One of the safeguards outlaws, for example, the conversion of natural forests to plantations – a substitution that would not be detectable in the long run by the carbon accounting method used. On the other hand, there is no safeguard to prevent the clear-cutting of natural forests for logging purposes. Moreover, the search for "co-benefits" is promoted in UNFCCC REDD+ decisions and strongly supported by some actors (von Scheliha *et al.,* 2011). This involves trying to obtain "potential benefits" from the actions implemented under REDD+ with respect to "the aims and objectives of other relevant international conventions and agreements" (Decision 2/COP 13). These co-benefits are often split into two major types: poverty reduction and biodiversity conservation. In this connection, in some countries, UNEP-WCMC is mapping forest areas that have both high carbon concentrations and an enormous wealth of biodiversity (UNEP-WCMC, 2008).

Certainly, the questions relating to environmental and social safeguards (and their monitoring and application) and co-benefits (their eventual compensation being linked to carbon offsets) are on the agenda of the Climate Convention talks, but countries diverge widely on what importance should be given to these. Implementing the safeguards on the ground is by no means a foregone conclusion. Although they seem to be a genuine priority for all of the donors (mainly as they are subject to legal and financial conditionalities), the promotion of co-benefits is confined to a few organisations (*e.g.* the European Commission, the German Ministry of Environment, UNEP, CBD).

Various authors are thus sending out warning signals with respect to the mechanism that is currently being prepared, categorically refusing to take it as a "miracle solution" and pointing up the naivety of having a single mechanism across countries with widely contrasted political and economic situations. "REDD+: everyone wants to believe that it's a miracle solution. The current debate is incredibly naive. In the end, it will enable developed countries to continue polluting while, for South countries, it will pay for their deforestation (CIFOR interview). Similarly, according to a representative from the NGO Les Amis de la terre: "Stopping deforestation is vital to stabilise the climate, but the REDD mechanism doesn't address this objective. Rather than strengthening the rights of forest communities, banning the conversion of forests to monoculture plantations or industrial logging areas, this mechanism offers a fantastic loophole for companies that can continue to pollute by buying forests and planting trees". [77]

## The voluntary carbon market

According to the EcoSecurities Survey (2009), buyers see the voluntary market as an opportunity to prepare for future tax obligations or a compliance regime requiring them to offset their GHG emissions. It also offers them a way to improve their corporate image in terms of green marketing and Corporate Social Responsibility (CSR) and to reduce the commercial risk due to the eventual boycotting of companies that do not invest in climate change mitigation.

Given these objectives, and with the idea of diversifying the repercussions of carbon investments, the notion of co-benefits also seems to be a key factor in enabling the voluntary carbon market to address forest-related environmental issues that go beyond carbon storage. This appears to receive some support from the different

[77] *Cf.* the video made by Les Amis de la Terre at:
http://www.cdurable.info/REDD-Reduction-Emissions-Deforestation-Degradation-Forets-Film-pedagogique.html.
Translator's translation.

actors. "The voluntary market makes it possible to address all of the pillars of sustainable development"; "a project with fewer co-benefits will be perceived less positively" ($CO_2$ Origination interview). Integrating environmental issues other than climate change mitigation – particularly biodiversity but also social issues – would enable these stakeholders to lessen the financial risk incurred by projects in contexts of high uncertainty. "Concerning carbon, we're nonetheless in a changing environment, and for forest carbon, it's even worse... we don't really know what tomorrow holds. We don't know which credits will be accepted tomorrow... And so he [the project proponent], in this context of uncertainty, he says to himself: the best guarantee I can have that my credits will be marketable in five years, is for me to be 'clean' on the three criteria. This means there's a hope of not being cheated" (CDC Climat interview).

Environmental criteria are thus included in the differentiation criteria in some of the many project certification standards available on the voluntary market [78] (Merger, 2008). WWF includes, for instance, two environmental and social criteria in the seven principles that it proposes for assessment of voluntary standards (WWF, 2010). Nevertheless, several standards do not address these areas: "VCS and CDM deal with the $CO_2$ side very well, but they don't develop or formalise co-benefits ($CO_2$ Origination interview).

Overall, at the environmental level, carbon is viewed by some as an "overarching" theme that has to allow, or even facilitate, the treatment of issues that go beyond the carbon issue: "carbon is an umbrella theme for us, as it affects everything" (ONFI interview); "forest carbon has something friendly about it as you can add layers: biological diversity, community management, forests that are home to some of the planet's poorest people... you can bring other things" ($CO_2$ Origination interview).

Although this mechanism raises hopes, the "carbon focus" still rouses some scepticism, and the environmental effectiveness of forest management methods that are linked to the carbon market has not yet been demonstrated. As some authors point out, "there are very few studies and little knowledge on the scientific and technical foundations and on the effectiveness of these mechanisms" [79] (Tsayem Demaze,

[78] Some examples of the main forest standards for the voluntary market: Scientific Certification Systems (SCS), Verified Carbon Standard – Agriculture, Forestry and Other Land Use (VCS AFOLU), Climate Community and Biodiversity Standards (CCBS), CarbonFix Standard (CFS), Chicago Climate Exchange (CCX), Climate Action Registry (CAR), the Plan Vivo system and CDM, which can also be used on the voluntary market (Chenost *et al.,* 2010).

[79] Translator's translation.

2010a). The mechanisms for "enhancing carbon storage" certainly set an explicit environmental objective of climate change mitigation but, for those who buy these carbon offsets, the primary objective is often economic. The challenge is thus to maintain and increase carbon stocks so as to secure investments. In the end, the environmental quality of the forest areas created or maintained under these mechanisms could fall far short of the ecological characteristics found in natural forest ecosystems.

### 4.4.3. *Arrangements aimed at promoting local community participation: how environmentally effective are they?*

The main purpose of SFM arrangements based on local community participation, as we saw earlier, is to improve the social dimension of logging operations. However, participatory management (community, joint, communal) also aims to address environmental issues even though this is not its primary objective.

The management rationale promoted by this type of arrangement has its roots in stakeholder theory: environmental problems are first analysed as problems related to coordination, encouraging community action, "good governance" and setting up bottom-up approaches that involve actors with empirical knowledge and expertise on their local resources, also termed "traditional" knowledge. The solutions proposed are then referred to using terms such as collective formulation of problems, information exchange, flexible and pragmatic arrangements, negotiations between stakeholders and the enrolment of beneficiaries (Leroy & Lauriol, 2011).

Moreover, according to the sustainable development rationale, reconciling environmental protection objectives and development objectives is a priority. As poverty is generally pointed to as the main culprit in the destruction of natural habitats, and forest habitats in particular, if the problems of poverty were solved, this would almost "automatically" solve environmental problems.

However, two major visions are at odds over this question (Ballet *et al.,* 2009). In the most widely held view, participatory management offers the conditions necessary to sustainably preserve resources by ensuring economic development for the poorest populations – which its advocates seek to promote (Schreckenberg & Luttrell, 2009). "It's not protecting animals that makes things move, you have to be realistic, it's protecting people that makes things move" (Proparco interview). The main argument contends that, thanks to economic development, local communities would no longer need to use natural resources to survive and thus impact them to a lesser extent (or use them more "reasonably"). The second view considers that ensuring natural resource sustainability requires setting up specific management bodies that pursue

explicit environmental conservation objectives, which to be achieved need precise management methods that are disconnected from economic development questions. The authors supporting this view underline that such management methods do not have to be compatible with an economic development objective for the benefit of local populations. They recommend that these issues be addressed separately (Redford & Sanderson, 2000).

In addition to these dichotomous standpoints, some authors have pointed out the vital and historical role of local populations in conserving biodiversity (Bray *et al.,* 2003; Dudley, 2008). They show that the knowledge and customary practices of local peoples, which are based on ancestral social norms, greatly help to protect natural resources, even if this is not *a priori* the stated goal (Vermeulen & Sheil, 2007; Berkes, 2009; Guéneau, 2011). The study of Bowler *et al.* (2010), for example, provides an assessment of over forty participatory management schemes across the world in the light of specific environmental criteria. The authors show that in most cases local communities participated in and actively promoted biodiversity conservation. Moreover, various findings confirm the key role of local people (Schreckenberg *et al.,* 2006; Schmitt *et al.,* 2009) in conserving forestland of high biological value, protecting water catchment areas and restoring degraded forest landscapes (Arinaitwe *et al.,* 2007; Malla, 2007; Yao, 2007). Recent studies also show the effectiveness of indigenous people in reducing deforestation, compared with the state-initiated efforts (Nelson & Chomitz, 2009). As for the Joint Forest Management experiments that began twenty years ago, a first assessment of this participatory management model can now be undertaken. Many people are still questioning the effectiveness of these programmes and their impact on resource management (Yildiz *et al.,* 1999; Kumar, 2002; Rishi, 2003; Rishi, 2007; Bhattacharya *et al.,* 2010; Macura *et al.,* 2011), but some now consider it to be a valuable tool for sustainable management (Singh *et al.,* 2011). The book by Méral *et al.* (2008) also establishes an *ex post* assessment of numerous programmes and projects involving the co-management of natural resources, particularly forests. The authors present contrasted cases of the successes as well as the limits and failures of this approach – failures that partly hinge on the notion of "community" and on how this notion is mobilised politically. "The systematic reference to local populations, for me, is a complete sham, with the word 'community', we're basically in the realm of empty rhetoric" (AFD interview).

Other authors now tend therefore to qualify the beneficial role of communities: "we shouldn't be under any illusion, we have a vision of local populations that is a little naive" (FUSAGx interview). Some research indeed shows that involving local communities in resource management can also lead to an increase in forest degradation (Dovonou-Vinagbè & Chouinard, 2009) and a loss of biodiversity (Acharya,

2003). Although failures are seemingly less frequent than successes (Guéneau, 2011), they should not be underestimated, as the example of co-management in the classified forests of Faya, Monts Mandings and Sounsan, in Mali, well illustrates. An *ex post* evaluation carried out in 2010 by AFD and the consultancy ICI reveals that these forests are in danger of disappearing fast (AFD, 2010). One of the actors involved responded to the report by writing: "the co-management of classified forests around Bamako is a clear failure, a calamity, over sixty years of effort totally wasted" (AGEFORE, corporate communication).

The plethora of local situations and contexts thus seems to preclude any hasty generalisations about the environmental effectiveness of participatory forest management schemes. When required, it seems in any case to be far from adequate to ensure environmentally sustainable forest management.

This review of the different SFM arrangement shows that, from the environmental angle, they are not very effective despite the progress and specific innovations that each one can bring. A certain ambiguity has been observed not only in their ability to integrate the environmental dimension, but also to make it effective on the ground, and thus to bring improvement to the ecological situation. And this raises the question of how much attention is paid to the environmental assessment of these arrangements on a more formal level. This is what we will now explore to conclude our analysis.

## 4.5. What are the formal processes for the environmental assessment of sustainable forest management arrangements?

In practice, a distinction tends to be made between two main types of formal environmental assessment tools: *ex ante* and *ex post* assessments. The former aims at identifying the potential environmental impacts of a project and proposing measures to avoid, mitigate or offset these. The latter, conducted during the project or after its completion, aims at assessing *in itinere* or *a posteriori* the effectiveness of the measures taken and, hence, the environmental effectiveness of the arrangements assessed. We first review the shortcomings of these two different assessment phases when applied to the forestry sector, and then go on to explore the evaluative potential of the SFM arrangements studied in order to understand how far these help to address the shortcomings observed.

### 4.5.1. *Very few environmental assessments in the forestry sector*

#### A little optimised *ex ante* phase…

In the e*x ante* phase, environmental assessment generally takes the form of an EIA or a strategic environmental assessment (SEA). EIA is the historical reference tool for environmental assessment. It rarely goes beyond project level. We saw in Part 2 that efforts have been made to frame and promote EIA practices in the forestry sector. Yet our bibliographic analysis, like the data collected during out interviews, led us to relativize their actual operationalization, which still appears to be very uncertain and ineffective in the sector.

Historically, environmental assessment methods have shifted from EIA to more specific and inclusive methods that address more strategic aspects during the assessment process (André *et al.,* 1999). This is the case of the SEA, which is applicable to policies, plans and programmes, that is to say, on a larger scale than projects (OCDE, 2006). Sadler and Verheem (1996, p.27) give the following definition: "SEA is a systematic process for evaluating the environmental consequences of proposed policy, plan or programme initiatives in order to ensure they are fully included and appropriately addressed at the earliest appropriate stage of decision-making on par with economic and social considerations". One of the specific features of SEA is that it offers the proponents of policies, plans and programmes the choice of alternative development paths based on a comparative analysis of the different possible environmental trajectories. However, the small number of completed forest-related SEAs that we were able to identify strengthens the idea that this tool is only very marginally used in the forestry sector.

#### *Ex post* environmental evaluations are virtually absent and have methodological shortcomings

Unlike EIAs, there are no legal requirements for *ex post* assessments in tropical countries: in the forestry sector, it is left entirely to the logger's discretion. They are however encouraged and promoted by donors. For example, SEA is the fourth and final step in the process for controlling environmental and social risks officially adopted in 2007 by the AFD Group: "An *ex post* assessment is the environmental and social performance of a project used for evaluating the effectiveness of the measures proposed and feedback" (AFD, 2007, p.3).

Our bibliographic search, however, was largely unsuccessful on this count. As a result, very few official *ex post* evaluations of SFM projects were collected and thus analysed in detail. From the few documents retrieved, we observed that the *ex post* evaluations carried out in the forestry sector overall highlighted how difficult it was for SFM arrangements to take environmental issues on board. For instance, if we refer to the very recent exercise of capitalising on AFD's twenty years of intervention in the forestry sector in the Congo Basin countries (Samyn *et al.,* 2011), one page is given over to an analysis of the environmental impacts, from which the following extracts are taken: "Like the social dimension, the environmental component was one of the main turning points of the FMP approach in the 2000s. Much like the social aspect, impact has so far been poor… As with FMPs in general, there is no objective data on outcomes in biodiversity. However, based on a few reports and interviews with seasoned experts in that field, the few outcomes have little impact. Generally, at the outset, biodiversity was insufficiently and improperly considered during the FMP design process, and was generally limited… biodiversity aspects, apart from large wildlife species, are often neglected, and results in non-protection owing to the absence of proper measures. Yet, in the absence of wildlife monitoring, the actual trends remain unknown" (*Ibid.,* p.107),

This finding is to some extent validated by the different interviews we conducted: *ex post* evaluation was only very rarely mentioned and little known by our interviewees. Many of them put this down to problems of methodology and feasibility. Some mentioned, for example, that the short timeframes for projects – whose implementation often has funding constraints – can sometimes be at odds with the lengthy, even very lengthy time span of environmental dynamics, and thus not always long enough to assess the beneficial or adverse effects on the environment.

Our analysis points to the weakness of formal *ex post* environmental evaluation processes for SFM arrangements, even though analysis of their environmental achievements would in fact help to drive verification and improvement of their environmental effectiveness. Some evaluation exercises show that this is indeed possible and justified, as in the case of the recent work by the AFD and ICI consultancy in Mali (AFD, 2010). This in-depth study was able to precisely identify the problems regarding the environmental objectives defined upstream, to warn about the impacts ("the main negative impact observed is that the forests are considerably degraded. They are threatened with imminent disappearance" [*ibid*]) and, after analysis, to propose recommendations.

To conclude, and despite some encouraging signs, the formal processes of environmental assessment applied to SFM arrangements still seem only very partially operational. In light of the weak implementation of EIA and *ex post* environmental evaluation, we decided to examine the evaluative potential that is sometimes associated with SFM arrangements, to see whether this was able to offset the observed lack of environmental assessments.

## 4.5.2. *What evaluative potential do SFM arrangements have?*

Many actors consider that is not necessarily useful to develop environmental assessments for forest management, provided one ensures that the SFM arrangements are adequately implemented. Their line of reasoning contends that these new arrangements are rigorous and can, if properly applied, both ensure an assessment *ex ante* (and during implementation) and minimise a project's potential impacts. It is this aspect that we will now examine.

### The evaluative potential of arrangements aimed at improving logging practices

#### *Sustainable forest planning and reduced-impact logging*

Several actors regard sustainable forest planning, and more specifically forest management plans, as a form of environmental assessment able to measure and minimise potential impacts on the environment affected by the logging project (Rougier, SFDIC, ATIBT-IFIA, FUSAGx and World Bank interviews; Szaraz, 2011). It would be useful to take a closer look at the requirements of EIA and compare them to those proposed by the FMP (*cf.* Table 16).

All EIAs theoretically follow a series of five systematic steps (André *et al.,* 1999; ESSEM, 2008):

1. *Diagnosis of the baseline environmental conditions*

- In conventional EIA, the initial diagnosis aims to identify the physical characteristics (topography, pedology, climate, winds, hydrography), biological characteristics (fauna, flora, vegetation structure), human and socio-economic characteristics (ethnography, social representation, actors, habitat, agriculture, hunting, livestock farming, fishing, trade, forest exploitation, social and community infrastructure facilities) of the environment in which the project intervenes. This diagnosis is most often supplemented by public consultation to deepen the analysis.

- The FMP requires a management inventory that provides more precise information on the harvestable timber resource, focussing exclusively on a limited number of tree species. A faunistic inventory is also mandatory for an FMP but it only targets flagship species and large fauna (large mammals). This over-restrictive inventory cannot stand in stead of the environmental diagnosis expected from an EIA.

2. *Assessment of potential impacts*

- EIA needs to identify upstream a series of potential impacts that the main activities of a project (infrastructure, inventory and management work, logging activities, product processing, handling, transport, etc.) might produce on an ensemble of socio-environmental components (air, soil, water, flora, fauna, socio-economic activities and infrastructures, culture and heritage, health and safety, etc.). A matrix of interactions between the activities and the socio-environmental components allows the impacts to be ranked on three levels of importance: absolute, relative and residual.
- The FMP does not explicitly mention the need to assess the impacts of the different scenarios envisaged. It can nonetheless be considered that the objective of adapting to the local MCD for each tree species and to the local rotation cycle means identifying the optimal logging intensity that would not adversely impact resource regeneration. The exercise is thus limited to analysing the impact of logging on the production capacity of a small number of species, and not on the environment overall. For RIL, the exercise is in greater depth but, even so, remains focussed on the direct impacts of logging without addressing the question of indirect, cumulative or residual impacts.

3. *Mitigation measures for all impacts*

- In an EIA, mitigation measures must be prescribed in function of the causes of the impacts identified upstream. Mitigation measures must be proposed for each project activity, based on the key principles of environmental management as set out in the national framework law (the principles of precaution, preventive and corrective action, responsibility and participation).
- RIL can be viewed as the main tool for mitigating impacts in a logging environment. Ecologists have show that RIL plays a role in reducing impacts on residual stands and soils (Putz *et al.,* 2008). Other studies however show that the logging techniques promoted under RIL continue to have an adverse impact, mainly on birds and bats, which are important seed dispersers (Castro-Arellano *et al.,* 2007;

Felton *et al.,* 2008; Castro-Arellano *et al.,* 2009). In addition, while measures to control poaching are usually implemented under an FMP, leakage effects (such as transferring hunting pressures from the concession area to elsewhere) are rarely taken into account or assessed, although these should be studied in an EIA (IDDRI interview). Clearly, these mitigation measures involve only a small share of activities, which are often one-off operations and mainly involve logging rather than forest management as a whole.

### 4. *Measures to compensate residual impacts*

- The compensation measures proposed for an EIA need to be integrated into the environmental management plan (EMP), which must be specifically defined by each State in compliance with its framework law on environment. The EMP constitutes an operational planning framework for an EIA and makes it possible to prescribe the reference environmental measures to be taken for a given project.
- The protection and conservation series defined in the FMP and for which no logging is planned could be seen as a compensation measure. However, the series, their surface areas and so on are not determined relative to the impacts produced by the logging activities, which means that they cannot be considered as real compensation measures.

### 5. *Impact monitoring*

- EIA should generally propose the setting up of a mechanism to supervise, monitor and support the environmental measures prescribed by the study, based on a set of indicators that assess the effectiveness of the process. The assessment of the project's environmental performance must be carried out on two levels: internally by the project proponent and externally by an auditing organisation.
- In the framework of forest planning, the texts provide for regular reviews of the FMP (generally every five years), but the criteria used seldom differ from those set for the initial FMP. Given the limits identified earlier, these reviews cannot provide sound environmental monitoring (apart from the fact that seemingly, they are only rarely effectively and systematically carried out).

Table 16 *Comparison of the evaluative potential of FMPs and EIAs*

| Assessment steps | EIA | FMP |
|---|---|---|
| 1. Diagnosis of baseline environmental conditions | Identification of all physical, biological, human and socio-economic characteristics of the environment | Management inventory only for commercial species and large fauna |
| 2. Assessment of potential impacts | Matrix for all activities that impact environmental components | Only the minimum cutting diameter (MCD) and rotation cycle |
| 3. Mitigation measures for all impacts | Measures based on the key principles of environmental management set out in the framework law | Only under RIL and only on residual stands and soils, anti-poaching measures + MCD |
| 4. Compensation measures for residual impacts | Compensation measures under an EMP | Addressed through the protection and conservation series but no attempt to match these measures with impacts |
| 5. Impact monitoring | Setting up of an indicator-based monitoring mechanism<br>Internal and external assessment of the mechanism | Only through 5-year reviews (legal requirement) based on the same principles criticised earlier |

*Source: the authors.*

Our analysis thus shows that the FMP and RIL do rely on some steps comparable to those of EIA, but that their concerns and the measures recommended fall far short of the environmental requirements expected of EIA. Moreover, the FMP reviews cannot be considered equivalent to an *ex post* environmental evaluation.

## The evaluative potential of certification

Along with the FMP and RIL, certification is the forest management tool that is most often seen by some forestry actors as having an evaluative potential (IDDRI, TFT, FNE, Rougier, WWF-Belgique, FSC-France, FUSAGx and World Bank interviews). In many ways, FSC certification is considered to be the system that best takes environmental issues on board. As above, we will illustrate the evaluative potential of certification by comparing the measures recommended by FSC certification system with the EIA steps.

All applicants for FSC certification need to comply with 10 principles and 56 criteria for good forest management. Principles 6, 7 and 8 (FSC, 2000) concern respectively:

- the environmental impact of logging:[80] "Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest";
- and monitoring: "Monitoring shall be conducted – appropriate to the scale and intensity of forest management – to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts".

Fifteen criteria set out under Principles 6, 7 and 8 give details on the measures to be taken in order to comply with these principles. Below, we compare these with the five systematic steps under EIA.

### 1. *Diagnosis of baseline environmental conditions*

This is launched with the formulation of the management plan recommended by the FSC (Principle 7). Criterion 7.1 recommends including a description of the resources to be managed, environmental constraints, and environmental safeguards to be based on an assessment of the environment concerned.

### 2. *Evaluation of potential impacts*

The FSC recommends using impact assessments prior to the start-up of logging operations and its results must be integrated into the management systems (Criterion 6.1).

### 3. *Mitigation measures for all impacts*

A number of mitigation measures are proposed. The FSC recommends controls and the need to provide safeguards to protect rare species (Criterion 6.2); unexploited sample areas representative of the unlogged forest as well as ecological forest functions must be maintained (Criterion 6.3); controls and the need to minimise impacts (Criteria 6.5); limitation, control and monitoring of pesticides and biological control agents, and taking substantive measures such as the disposal of chemical and toxic waste at off-site locations (Criteria 6.6 to 6.10).

[80] A new list of FSC principles, criteria and indicators, voted and approved by its members, was made available in February 2012. The following analysis does not take these recent modifications into account.

### 4. *Compensation measures for residual impacts*

The FSC gives little guarantee of measures to compensate impacts. More focus is given overall to mitigation measures. The only compensation measures involve restoring and improving degraded landscapes, soil erosion and watersheds (Criterion 6.5) and establishing protection areas and conservation zones (Criteria 6.2). .

### 5. *Impact monitoring*

The FSC puts special focus on monitoring operations and measures taken. Monitoring must take into account growth rates /regeneration and the condition of the forest, the composition and observed changes in its biodiversity and the environmental and social impacts of harvesting and other operations (Criterion 8.2). Monitoring also has to cover the entire chain of custody (Criterion 8.3). It recommends that monitoring procedures be replicable over time (Criterion 8.1), to allow management plans to be modified in line with results obtained. Unlike EIA, the FSC's Principle 8 recommends using assessment measures during the project. The additionality between EIA and FSC thus makes it possible to monitor logging operations throughout the entire project.

FSC certification thus provides for an *ex ante* self-assessment to mitigate the environmental impacts of certified logging as well an assessment akin to an *ex post* evaluation in that it aims to integrate the actual results observed on the environment. These assessments are carried out by independent third-party verifying bodies. The assessors participate in regular audits using the FSC PC&I matrix, which is based on a generic reference framework intended to be adaptable to all forest types. As a result, FSC certification can be considered as integrating environmental issues to a certain extent. There is, however, some criticism particularly regarding the validity of the reference framework used, given the sharp differences in local contexts and realities (Schulze *et al.,* 2008; Cerutti *et al.,* 2010), and its lack of precision (Karsenty, 1997). Furthermore, we observed that overall the FSC set of evaluative criteria tends to focus on assessing impacts on the physical environment and above all on logged species (FSC, 2000).

## Evaluative potential of mechanisms aimed at enhancing carbon storage

We will now follow the same line of reasoning and analyse the evaluative potential of several carbon certification standards to see the extent to which they are (or not) able to make up for the identified lack of EIAs. We draw mainly on the research of Merger (2008) and his comparison of four certification standards for carbon projects on the voluntary market: Verified Carbon Standard – Agriculture, Forestry and Other Land Use (VCS AFOLU), the Climate Community and Biodiversity Standards (CCBS), the CarbonFix Standard (CFS) and the Plan Vivo system.

Certification projects on the voluntary carbon market first need to quantify their carbon stocks. The purpose of this assessment, carried out periodically, is to determine how many carbon credits the project is likely to generate or to make adjustments relative to the initial level of carbon credits. The way carbon stocks are quantified varies depending on the standard, but each uses a technique based on a scientific IPCC-approved methodology.

In addition to the focus on carbon, each certification system uses some additional and mainly environmental criteria that are relatively similar across the systems:

- the CCBS standard uses three environmental criteria to quantify a project's impact on the environment and biodiversity. The assessment must *(i)* describe the diversity of species and ecosystems and any threats they face; identify and assess *(ii)* zones with high conservation value and *(iii)* zones with high biodiversity conservation value. CCBS projects must also take particular care to avoid introducing invasive species and strictly limit the use of GMOs;
- the CFS system also proposes three broad-based environmental criteria. The projects must have a positive impact on biodiversity, soil and water resources. Ten per cent of the project area must be dedicated to setting up nature conservation areas in compliance with the IUCN's protected areas categories. CFS projects must also take particular care to avoid introducing invasive species and GMOs, to limit the use of chemical inputs and to protect floristic and faunistic species on the IUCN Red List;
- Plan Vivo projects are based on four environmental criteria that are as broad-based as the CFS criteria. The projects are assessed on the impact that they will have on biodiversity, soil stability, watershed protection and the recovery of ecosystems that have been degraded or are under threat. Plan Vivo certification also encourages the planting of native species for forest regeneration and promotes agroforestry practices;
- the VCS AFOLU standards encourage project developers to use the environmental assessment criteria defined by other certification standards, such as CCBS, CFS and Plan Vivo among others. Depending on the standard chosen the assessment method can thus vary considerably.

As in forest certification, each environmental criterion has a set of indicators that are nonetheless relatively vague and leave the verifiers a great deal of leeway. For instance, the CCBS proposes for its "biodiversity" environmental criterion: "a description of current biodiversity in the project area and threats to that biodiversity, using appropriate methodologies (*e.g.,* key species habitat analysis, connectivity analysis), substantiated where possible with appropriate reference material" (CCBA, 2005, p.8).

In addition, all carbon certification standards impose a more or less periodic verification by a third party:

- once a project has been validated for CCBS certification, a verification is required every five years to compare the initial state of the project against its current state;
- for the CFS system, the intervals between verifications vary depending on the age of the project. These are regular and their frequency gradually declines from two to five years over the first twelve years of the project and thereafter, every five years;
- projects under the Plan Vivo standards are only verified once prior to issuance of the $CO_2$ certificates and on a non-systematic basis. Thereafter, verifications are held every three to five years or when a substantial amount of carbon credits have been sold;
- VCS systems are only assessed once, at the beginning of the project cycle. VCS AFOLU incentivises project developers to conduct a voluntary assessment every five years.

This example shows that some carbon certification systems integrate the question of environmental impacts into their processes. However, as these are vague, poorly managed and not homogeneous, they cannot be deemed to fully meet EIA requirements. As in FSC certification, the periodic verifications required constitute a form of *ex post* evaluation, but they focus mainly on carbon storage and include no steps enabling the broader environmental results to be reliably measured.

As for the arrangements aimed at enhancing local community participation, there is no *ex ante* or *ex post* environmental evaluation mechanism that would be on a par with EIA or *ex post* evaluation processes.

Some of the SFM arrangements geared to improving logging practices and enhancing carbon storage thus seem to incorporate a few environmental assessment criteria that are relatively similar to the assessment process required of EIA or e*x post* evaluation. RIL, FSC certification and some carbon market certifications appear the most promising on this count. Nonetheless, their patchy requirements, their vagueness and the fact that their criteria and "pseudo-evaluative" approaches have not been mainstreamed mean that they are much less rigorous than the requirements for EIA and *ex post* environmental evaluation.

# Conclusion

In this final part, and by way of conclusion, we return to several important points that our study has been able to uncover and clarify

What is SFM and to what extent has it enabled the environmental stakes relating to forests to be taken into account? These are the basic questions that this book has tried to answer, proposing an assessment of the current status of a concept that is widespread in both the environmental and development sectors.

The SFM concept emerged concurrently with that of sustainable development in the early 1990s. With a legacy of past practices (*cf.* Part 1), it has gradually become institutionalised from a regulatory viewpoint in the tropical countries, notably driven by international negotiations and authorities. The development of the SFM concept has thus gone hand in hand with very strong legislative and regulatory activity in the different tropical countries, marked by several phases alternating between the formulation, adoption, revision and regulation of national forest policies. This dynamic has confirmed some earlier principles of management and regulation, as well as introducing some new SFM-specific elements (*cf.* Part 2).

Alongside this regulatory thrust, the SFM concept has produced new and constantly evolving management arrangements over the last twenty years. They can be classified into three major categories depending on the main objectives that they target (*cf.* Part 3).

1. *Arrangements aimed to improve logging practices:* focussed on sustainable forestry, their primary objective is sustained timber production (Niesten & Rice, 2004). In this category, we find sustainable forest planning, reduced-impact logging (RIL) and forest certification.
2. *Arrangements aimed to enhance carbon storage:* over the last two decades, several arrangements have developed which are intended to increase or maintain the carbon-storing capacity of forest ecosystems by attributing economic value to these stocks. They notably involve carbon credits traded on the compliance market under the Kyoto Protocol, credits on the voluntary market (outside of the Kyoto Protocol and thus non-binding) and the REDD+ mechanism currently being developed.

3. *Arrangements aimed to increase the participation of local communities:* the decentralisation of decision-making powers and greater involvement of local communities have been observed in development projects since the 1980s (Leroy, 2008). In the area of tropical forest management, this reflected the assumption that SFM could only be effective if the participation of local populations was maximised. This participation has given rise to various participatory management arrangements such as joint management, community forestry and communal forests.

Behind the seeming polysemy of the SFM concept, our analysis has shown that what these systems have in common is the fact that most of them rely on regulation by the market or by contracting between stakeholders, with the State's role of providing technical support gradually disappearing and refocusing on the legal framework required to implement the arrangements promoted.

From an environmental viewpoint, some improvements, driven by SFM, have gradually been made to forest jurisdictions in tropical countries: deeper integration of the forest ecosystem dimension, greater attention to knowledge on ecological balances, the mainstreaming of EIA, and the reinforcement of measures to protect forests in a logged environment. Yet, despite the progress made in environmental protection, different and often interrelated criticisms call into question the real ability of these legal systems to effectively meet the environmental challenges. Often mentioned points include the lack of implementing decrees, the institutional complexity that impedes the emergence of real leadership in environmental issues in the forestry sector, the poor (or even non-existent) enforcement of regulations (EIAs not, or poorly, carried out, illegal logging) and finally the insufficient resources of the state authorities responsible for seeing that these regulations are enforced.

The management arrangements presented constitute the main operational responses of SFM to tackling the environmental crisis observed in forests. While they tend to take on hybrid forms on the ground in order to better integrate the three pillars of sustainable development, the economic dimension, which involves first and foremost the profitability of logging activities, remains the central concern. Probably, the most striking finding of this study is that the very broad term "SFM" ultimately addresses "sustainable forest exploitation". Whether it be the scientific literature on SFM, the abundance of grey literature, the actors' conception of SFM or the operational management arrangements it has helped to implement, SFM's main priority is timber production, and marginally the harvesting of some NWFPs. In the sustainable development rationale, the challenge is to dovetail the environment with

the economy and with sectoral policies (in this case, with the economy and forest policy). The environmental, and social, objectives that SFM could support are for the most part analysed and experienced as constraints to logging that need to be internalised, and less as fundamental strategic issues for innovation in managing these ecosystems and conserving their environmental assets.

The arrangements designed to improve logging practices are the most explicit on this count. Generally speaking, the main argument advanced with respect to their usefulness is that they can enable loggers to maintain a profitable business, which thus avoids the conversion of forestland to other uses. But many others underline the limitations of such arrangements, which in any case bring about deep changes in the ecosystems. Moreover, their complex and costly implementation is still often scarcely effective and insufficiently monitored.

The arrangements aimed at enhancing carbon stocks, of course, set an explicit environmental goal *vis-à-vis* climate change but pursue, first and foremost, an economic objective for those who invest in carbon credits. Although some view carbon offsetting as an "umbrella" theme that should enable or even facilitate the treatment of environmental issues beyond the question of carbon, the carbon focus still meets with scepticism, and the environmental effectiveness of the forest management practices linked to the carbon market has not yet been evidenced. The environmental quality of the forest areas created or maintained through these mechanisms may ultimately fall far short of the ecological characteristics of a natural forest ecosystem.

As for the arrangements aimed at increasing the participation of local communities, one of the discourses claims that the traditional knowledge and practices of local people, based on customary social norms, greatly contribute to the conservation of natural resources (even if this is not the stated objective). Yet, the huge diversity of local situations and contexts precludes sweeping generalisations about the environmental effectiveness of participatory forest management. When this participation is required, it appears far from sufficient to ensure the environmental sustainability of SFM.

On top of these findings from the bibliographic analysis and the interviews, it seems that a large number of publications focus on environmental assessments and the challenges of implementing them in outstanding ecosystems such as tropical forests. However, applying this approach to forestry activities strictly speaking has so far roused only limited interest. The rare publications (though their number is growing) that focus on forestry sector EIAs deal exclusively with the management of industrial

and health risks for infrastructure in the forestry and wood sector (forest roads and access routes, camps, installation of sawmills, etc.) and *ex post* environmental evaluation of "tropical forest ecosystem management" by the forestry sector has not really produced any publication(s). The low level of interest in methodologies for the environmental assessment of forestry activities seems to underpin the idea that existing management arrangements are by construction "sustainable" and "green" and thus have no need for an evaluative approach (either *ex ante* or *ex post*) from an environmental point of view. Moreover, the problem is very often reduced to a problem of forestry sector "governance" rather than to one involving the kind of management arrangements proposed or the level of environmental performance defined. This situation means that very few measures are taken to verify that SFM is effective and efficient. The normative environmental criteria to be met are still rarely made explicit and not often assessed. For want of a commonly accepted frame of reference, each actor tends to develop and promote their own PC&I in a procedural perspective, to the detriment of an in-depth analysis of the results to be targeted and then actually achieved. Yet, a clearly defined ecological frame of reference coupled with a drive for forestry-specific assessments is necessary to ensure that the arrangements implemented produce the expected effects in terms of environmental effectiveness, and thus clarify responsibilities regarding damage to the forest ecosystems.

Generally, it appeared that the forest-related environmental concerns have developed in the literature on SFM, with one concern tending to supplant another. Thus, in recent years, carbon storage and carbon credit trading approaches have taken on great importance. As for biodiversity, this topic seems to have been more specifically addressed between 1998 and 2005 but the analysis showed that the SFM literature addressed this issue with considerable bias, and focused primarily on the question of preserving forest cover and commercial species. Moreover, no management arrangements promoted by SFM have a specific focus on biodiversity. Quite surprisingly, a very small proportion of the bibliographic corpus analysed during this study on the term "*gestion durable des forêts tropicales/sustainable tropical forest management*" deals with protected areas, for example. The interviews nonetheless highlighted that these areas should be considered as one of the crucial arrangements for the sustainable management of tropical forests (which would certainly seem to fit with the environmental weaknesses identified for each category of existing SFM arrangements). To this extent, biodiversity is still on the losing end of SFM, despite the fact that biodiversity degradation is central to the issues affecting tropical forests ecosystems and the fact that these issues have been quite regularly foregrounded since 1992.

The research carried out on these questions seems to be very little developed. Yet, it seems essential to build bridges between the forestry sector and researchers specialising in conservation, if we want to build management arrangements that are likely to come up with some concrete responses to the problems involving the very high biodiversity loss now observed.

To conclude, there appears to be continuing tension between a "sustainable (tropical) forest management" mainly geared to logging activities and a conservation sector still perceived as a potential brake to the industry's growth. In this context, environmental stakes are given short shrift compared to economic stakes. The situation could certainly be greatly improved by implementing strategic environmental assessment in the forestry sector and by dovetailing knowledge from the forestry sector with knowledge from the conservation sector. A regular cross-sectoral dialogue between the forestry sector and the other sectors exerting pressure on forests (agriculture, mining, infrastructure) would also enable to better identify the constraints and create margins of manoeuvre to improve the environmental management arrangements for forests. Certainly, it is unrealistic to think that the forestry sector alone is able to ensure environmentally effective SFM.

# Appendices

## 1. Legal and institutional frameworks in tropical countries

| Country | Legal framework | | | | | | National Forest Programme | | |
|---|---|---|---|---|---|---|---|---|---|
| | Main forest law | Regulation | | Amend-ment | | Others jurisdictions | | | Status |
| **Africa** | | | | | | | | | |
| Angola | - | 1962 | 2 | 2000 | 1 | - | Yes | - | Being drafted |
| Benin | 1993 | 1996 | 1 | - | - | - | Yes | 2007 | In force |
| Burundi | 1985 | - | - | - | - | - | Yes | - | Being drafted |
| Cameroon | 1994 | 1995 | 12 | 2000 | 1 | - | Yes | 2005 | Under implementation |
| Congo | 2000 | 2002 | 13 | 2009 | 1 | - | Yes | - | Being drafted |
| Côte-d'Ivoire | 1965 | 1978 | 1 | - | - | - | - | - | - |
| Gabon | 2001 | 1993 | 3 | 2002 | 1 | - | Yes | 1993 | Temporarily suspended |
| Gambia | 1998 | 1998 | 1 | - | - | - | Yes | 2000 | Under revision |
| Ghana | 1974 | 1974 | 3 | 1994 | 4 | 3 | Yes | 1993 | Under revision |
| Guinea | 1999 | 1989 | 2 | 1990 | 2 | 2 | Yes | 1989 | In force |
| Guinea-Bissau | 1991 | 1996 | 2 | - | - | 1 | Yes | 1992 | Under revision |
| Equatorial Guinea | 1997 | 1992 | 1 | - | - | 1 | Yes | 2000 | Under preparation |
| Liberia | 2000 | 2001 | 5 | 2006 | 1 | 2 | Yes | 2008 | In force |
| Madagascar | 1997 | 1998 | 6 | - | - | 6 | No | - | - |
| Nigeria | 1961 | 1963 | 1 | - | - | - | Yes | 2002 | Under revision |
| Uganda | 2003 | - | - | - | - | 2 | Yes | 2002 | In force |
| Central African Republic | 1990 | 1991 | 2 | 2008 | 1 | - | Yes | 1994 | Temporarily suspended |

| Country | Legal framework | | | | | | National Forest Programme | | |
|---|---|---|---|---|---|---|---|---|---|
| | Main forest law | Regulation | | Amend-ment | | Others jurisdictions | | | Status |
| Democratic Republic of the Congo | 2002 | 2002 | 4 | 2009 | 1 | 1 | Yes | 2009 | under implementation |
| Rwanda | 1988 | 2003 | 1 | - | - | - | - | - | - |
| São Tomé and Principe | 2001 | - | - | - | - | 1 | - | - | - |
| Senegal | 1998 | 1999 | 1 | - | - | - | Yes | 1992 | In force |
| Sierra Leone | 1988 | 1989 | 1 | - | - | - | No | - | - |
| Tanzania | 2002 | 1996 | 3 | - | - | 4 | Yes | - | In force |
| Chad | - | - | - | - | - | 1 | Yes | 1972 | In force |
| Togo | 2008 | - | - | - | - | 3 | Yes | - | - |
| Zambia | 1999 | 2003 | 2 | 2006 | 1 | - | Yes | 1996 | Temporarily suspended |
| **America** | | | | | | | | | |
| Belize | 1927 | 1973 | 5 | 1997 | 1 | - | - | - | - |
| Bolivia | 1996 | 1996 | 5 | 1999 | 1 | - | Yes | 2008 | In force |
| Brazil | 1965 | 2006 | 3 | 2007 | 2 | - | Yes | 2000 | In force |
| Colombia | 2006 | 1996 | 1 | - | - | 9 | Yes | 2000 | Under revision |
| Costa Rica | 1996 | 1996 | 11 | 1997 | 10 | 8 | Yes | 2001 | Under revision |
| Ecuador | 2003 | 2004 | 5 | 2004 | 4 | 5 | Yes | 2002 | In force |
| Guatemala | 1996 | 1997 | 4 | 2004 | 1 | 3 | Yes | 2003 | In force |
| Guyana | 1998 | 1973 | 1 | 1997 | 2 | 1 | Yes | 2001 | In force |
| French Guiana | 2010 | 2005 | 3 | 2008 | 1 | 2 | Yes | 2006 | In force |
| Honduras | 2008 | - | - | - | - | 5 | Yes | 2004 | In force |
| Mexico | 2003 | 2005 | 2 | 2008 | 1 | 2 | Yes | 2007 | In force |
| Nicaragua | 2003 | 2003 | 5 | 2004 | 2 | 4 | Yes | 2008 | In force |
| Panama | 1994 | 1998 | 10 | 2005 | 2 | 10 | Yes | 2008 | In force |
| Peru | 2008 | 2009 | 1 | - | - | - | Yes | 2004 | In force |

| Country | Legal framework | | | | | | National Forest Programme | | |
|---|---|---|---|---|---|---|---|---|---|
| | Main forest law | Regulation | | Amend-ment | | Others jurisdictions | | | Status |
| Surinam | 1992 | - | - | - | - | - | Yes | 2006 | Under preparation |
| Venezuela | 1965 | 1969 | 4 | 1977 | 3 | 3 | No | - | - |
| Asia | | | | | | | | | |
| Bangladesh | 1927 | 1959 | 6 | 1992 | 1 | - | Yes | 1995 | In force |
| Brunei Darussalam | 2002 | 2002 | 1 | - | - | - | Yes | - | In force |
| Cambodia | 2003 | 2003 | 1 | - | - | 2 | Yes | 2007 | Under preparation |
| China | 1998 | 2000 | 1 | - | - | - | Yes | 2006 | In force |
| India | 1927 | 1981 | 2 | 1980 | 3 | 3 | Yes | 1999 | In force |
| Indonésia | 1999 | 2010 | 4 | 2008 | 1 | - | Yes | 2000 | In force |
| Laos | 2007 | - | - | - | - | - | Yes | 2005 | - |
| Malaysia | 1984 | 1969 | 1 | 1984 | 3 | - | Yes | 2006 | In force |
| Myanmar | 1992 | - | - | - | - | - | Yes | 2001 | In force |
| Papua New Guinea | 1991 | 1998 | 1 | - | - | - | No | - | - |
| Philippines | 2007 | 2007 | - | 2009 | 3 | 7 | Yes | 2003 | In force |
| Sri Lanka | 1907 | 1979 | 2 | 1951 | 7 | 1 | Yes | - | - |
| Thailand | 1941 | - | - | - | - | 3 | Yes | 1985 | In force |
| Vietnam | 2004 | 2006 | 4 | 2006 | 1 | 5 | Yes | 1987 | In force |

*Source: the authors.*

# 2. Legal framework for environmental impact assessment

| Country | Reference to EIA in the legal frameworks | | | | | | The EIA procedure: Applicability threshold and forestry activities concerned | |
|---|---|---|---|---|---|---|---|---|
| | Environment Code | | Forest Code | | Specific regulations | | | |
| | Exists | Years | Exists | Years | Exists | Years | Threshold | Main activities |
| Bangladesh | Yes | 1995<br>1997 | No | - | No | - | None | Implementation of paper industry projects in forest areas |
| Benin | Yes | 1999 | Yes | 1996 | Yes | 2001 | Very precise | Forest clearance, reafforestation, silvicultural treatment, NWFP harvesting, classification and declassification of the State's forest estate, creation of protected areas |
| Brunei Darussalam | No | - | No | - | No | - | - | - |
| Burundi | Yes | 2000 | No | - | No | - | None | Under preparation |
| Cambodia | Yes | 1999 | Yes | 2003 | Yes | 1999 | Precise | Logging concessions, all activities in mangroves and wetlands, construction of roads in protected areas |
| Cameroon | Yes | 1996 | Yes | 1995<br>2001 | No | - | Very vague | Development of protected areas and logging in FDUs, sales of standing volume, agroforestry |
| Congo | Yes | 2001<br>2009 | Yes | 2000<br>2002 | Yes | 2009 | None | All management plans, forestry concessions, declassification and clearance of forest belonging to the national forest estate |

| Country | Reference to EIA in the legal frameworks | | | | | | The EIA procedure: Applicability threshold and forestry activities concerned | |
|---|---|---|---|---|---|---|---|---|
| | Environment Code | | Forest Code | | Specific regulations | | | |
| | Exists | Years | Exists | Years | Exists | Years | Threshold | Main activities |
| Côte d'Ivoire | Yes | 1996 | No | - | No | - | Vague | Forest clearance and reafforestation under forestry planning |
| China | No | - | No | - | No | - | - | - |
| Gabon | Yes | 1993 2005 | Yes | 2001 | Yes | 2005 | Precise | Clearance of non-permanent forests, reafforestation of large areas, projects implemented outside the limits of protected areas |
| Gambia | Yes | 1994 | Yes | 1998 | No | - | None | Logging, clear-cutting, reafforestation and deforestation, forest plantations, amendments to forest policies, commercial use of fauna and flora, introduction of new species |
| Ghana | Yes | 1999 2004 | Yes | 1997 | No | - | None | Conversion of hill forest areas, exploitation or conservation of forest areas bordering protected areas and/or in water catchment basins, conversion of wetlands, conservation projects |
| Guinea | Yes | 1987 1989 | No | - | Yes | 1989 | Very vague | Clearance of woods and forests used for commercial or industrial purposes |
| India | No | - | No | - | No | - | - | - |

| Country | Reference to EIA in the legal frameworks | | | | | | The EIA procedure: Applicability threshold and forestry activities concerned | |
|---|---|---|---|---|---|---|---|---|
| | Environment Code | | Forest Code | | Specific regulations | | | |
| | Exists | Years | Exists | Years | Exists | Years | Threshold | Main activities |
| Indonesia | Yes | 2000<br>2006<br>2010 | No | - | Yes | 2000<br>2006 | Precise | Logging activities in different forest estates |
| Laos | Yes | 1999 | Yes | 2007 | No | - | None | - |
| Liberia | Yes | 2002 | Yes | 2006 | No | - | None | Logging and wood processing, forest plantations, deforestation, introduction of species, creation of protected areas |
| Madagascar | Yes | 1990 | Yes | 2005 | No | - | Vague | Logging, introduction of species, projects to create protected areas |
| Malaysia | Yes | 1987<br>2000 | No | - | Yes | 1987<br>2000 | Precise | Transformation of large forest areas, exploitation or conservation of mangroves and forest areas bordering protected areas and/or in water catchment basins, conversion of mountain forests |
| Myanmar | No | - | No | - | No | - | - | - |
| Nigeria | Yes | 1992 | No | - | Yes | 1992 | Precise | Transformation of forest areas, exploitation or conservation of mangroves and forest areas bordering protected areas and/or in water catchment basins, conversion of mountain forests |

| Country | Reference to EIA in the legal frameworks | | | | | | The EIA procedure: Applicability threshold and forestry activities concerned | |
|---|---|---|---|---|---|---|---|---|
| | Environment Code | | Forest Code | | Specific regulations | | | |
| | Exists | Years | Exists | Years | Exists | Years | Threshold | Main activities |
| Uganda | Yes | 1995<br>1998<br>1999 | Yes | 2003 | Yes | 1998<br>1999 | None | - |
| Papua New Guinea | Yes | 2000<br>2002 | Yes | 1991 | No | - | None | - |
| Philippines | Yes | 1977<br>1978<br>1981 | Yes | 2009 | Yes | 1978<br>1981 | None | Wood processing projects, logging, infrastructure projects in forest areas, introduction of fauna, forest occupancy, extraction of mangrove products |
| Central African Republic | Yes | 2007 | No | - | No | - | None | *Under preparation* |
| Democratic Republic of the Congo | Yes | 2011 | Yes | 2002<br>2006 | Yes | 2011 | None | *Under preparation* |
| Rwanda | Yes | 2005<br>2008 | No | - | Yes | 2008 | None | Any work in protected areas and their surroundings |
| Senegal | Yes | 2001<br>2002 | Yes | 1998<br>1999 | Yes | 2002 | None | Forest management plans, forestry concessions, any project that alters the exploitation of renewable resources in ecologically fragile zones |
| Sierra Leone | Yes | 2008 | No | - | No | - | None | Any project that alters the exploitation of renewable resources and industrial activity |

| Country | Reference to EIA in the legal frameworks | | | | | | The EIA procedure: Applicability threshold and forestry activities concerned | |
|---|---|---|---|---|---|---|---|---|
| | Environment Code | | Forest Code | | Specific regulations | | | |
| | Exists | Years | Exists | Years | Exists | Years | Threshold | Main activities |
| Sri Lanka | No | - | No | - | No | - | - | - |
| Tanzania | Yes | 2004 2005 | Yes | 2002 2005 | Yes | 2005 | Vague | Logging and wood processing industries, infrastructure projects in forest areas, introduction of new species, commercial harvesting of wood products, creation of protected areas |
| Chad | Yes | 1998 | No | - | No | - | None | *Under preparation* |
| Thailande | Yes | 1992 | No | - | No | - | None | - |
| Togo | Yes | 2008 2006 | Yes | 2008 | Yes | 2006 | Very vague | Reafforestation operations, development of wetlands and mangroves, logging, introduction of new species, creation of protected areas |
| Vietnam | No | - | No | - | No | - | None | - |
| Zambia | Yes | 2006 | Yes | 1999 | Yes | 2006 | Precise | Logging in sensitive areas, reafforestation and deforestation, processing facilities, introduction of new species, creation of protected areas |

*Source: the authors.*

# 3. Methodology

A vast bibliographic review on the theme of SFM was conducted for the purposes of this study. In this section, we outline the methodology for the different documentary, statistical and lexicometric analyses that were performed on this corpus.

## 1) *Data collection*

The first step was to collect a large number of documents on the theme studied. The selection covered a diversity of sources:

- scientific publications from peer-reviewed journals
- other documents produced by scientific research, such as doctoral theses, activity reports and technical documents from research centres
- grey literature from donors, IGOs, NGOs, private sector enterprises, etc.
- international conventions, national laws and regulatory texts
- courses given by the former *École nationale du génie rural des eaux et forêts* (ENGREF) in Montpellier over the period 1990-2010, as well as research papers by students that followed the forestry engineering training programme
- books
- Internet sites
- project formulation and evaluation documents

Supplementary documents were also collected to help with the writing of this book, but these were not systematically analysed. The bibliographic survey enabled us to collect 2,520 references written in French, English, Spanish or Portuguese (*cf.* Table 16).

Table 17 *Number of references consulted by the authors (by type and by language) for this study*

| Type | French | English | Spanish | Portuguese | Total |
|---|---|---|---|---|---|
| Scientific publications in peer-reviewed journals | 152 | 1,160 | 6 | 1 | 1,319 |
| Other scientific research documents | 9 | 32 | 0 | 1 | 42 |
| Grey literature | 207 | 345 | 8 | 0 | 560 |
| Project formulation & evaluation documents | 1 | 14 | 0 | 0 | 15 |
| International and national legal texts | 92 | 145 | 119 | 15 | 371 |
| Books | 2 | 5 | 0 | 0 | 7 |
| ENGREF course material and dissertations | 43 | 7 | 0 | 0 | 50 |
| Internet sites | 3 | 9 | 2 | 0 | 14 |
| Other documents (not included in the statistical and lexicometric analyses) | 57 | 82 | 3 | 0 | 142 |
| Total | 566 | 1,799 | 138 | 17 | 2,520 |

## 2) *Building the corpora*

### Scientific publications

The main search engines for scientific papers available on-line were used to collect these documents. The searches were carried out with the following search engines: Web of Science, Scopus, Hal, revue.org, Cairn, Sage and SocIndex. In addition, more specific searches were carried out on two French scientific forestry journals: the *Revue forestière française* and *Bois et forêts des tropiques.*

For these databases, the keywords used to search for references systematically included the words "*gestion*" and/or "*durable*" for the French-language searches and "sustainable" and/or "management" for English. The systematic use of the

keyword "*durable*" (or "sustainable") was intended to identify all the research topics wishing to be linked with this concept. The keywords "*forêt*" and/or "*tropical*" ("forest" and/or "tropical" in English) were also chosen. The search was carried out, as far as the search engines permitted, on the titles, keywords and abstracts of the papers in the bibliographic databases. As the search returned a very large number of references, a selection was made on the basis of expert opinion in order to choose from the titles and available abstracts those that were the most relevant to the scope of our study.

### Legal texts

These documents were chosen from the FAO's legislative database (FAO-LEX: http://faolex.fao.org/faolex/index.htm), which provides an online collection of legal texts by country. The English version of the database was used and enabled us to obtain detailed bibiliographic records with the corresponding documents in digital format. A search was carried out using the keywords "sustainable", "forest", "management" and/or "environment" for all of the 56 countries selected (*cf.* Part 2). All the texts addressing the theme of this study were selected.

In addition to the available national legal texts, a search on government sites enabled us to retrieve international legal texts, such as international framework conventions, multilateral agreements, etc.

### Grey literature

The grey literature makes up a corpus of widely differing types of data that are difficult to catalogue and select. The first step was to select a group of institutions (NGOs, IGOs, donors, private sector companies, consultancies, specialised associations, etc.) that were already recognised as key actors in the international forestry sector.

These documents were retrieved from the websites of each institution by searching document titles and content, to establish the importance given to the theme of this study and the frequency of keywords such as "*gestion*", "*durable*" and "*forêt*".

### Course materials and student research papers

The documents in this category are available in the AgroParisTech documentation centre in Montpellier. Thorough searches were carried out in the training materials used for the programmes dispensed by this organisation on the subject of managing tropical ecosystems over the 1990–2010 period, as well as in student research papers over the same period. A summary analysis of the available texts enabled us to select a certain number of documents.

### Other documents

Other documents (books, project formulation and evaluation documents, websites, etc.) were collected on specific points as the study advanced in order to complete the analysis.

## 3) *Bibliometric and lexicometric analysis*

The lexicometric analysis involved identifying, in each corpus, the trends in the use of a certain number of lexical elements. The analysis was carried out on entire texts or/and available bibliographic records.

### Referencing

All documents in the general corpus were referenced using the bibliographic software EndNote (EndNote© 2012 Thomson Reuters). This software enabled us to use bibliographic records that give information on a set of fields, thus providing rapidly accessible information on the type and contents of a document.

### Systematic analysis

Two complementary analyses were systematically performed on the corpus of scientific texts and the corpus of legal texts:

- Two complementary analyses were systematically performed on the corpus of scientific texts and the corpus of legal texts:
- a statistical and bibliometric analysis was carried out on the available EndNote bibliographic records using the Excel data processing application© 2006 Microsoft Corporation). The most relevant bibliographic records were selected for analysis (1,150 references from scientific texts and 334 from legal texts). The Excel software permitted us to process these records statistically according to a set of key criteria (geographical origin, year of publication, word frequencies in the titles and the abstracts, author's name, name of the journal and the frequency of keywords chosen by the authors);
- a lexicometric analysis was performed using the text-mining engine of the software package R (© 2011 The R Foundation for Statistical Computing). This allowed us to extract all of the words present in documents that were available in digital format (718 documents including 511 scientific publications and 207 legal texts). The Excel and R software then enabled a frequency analysis of the words in each document and a statistical comparison between the documents.

## 4) *Analysis of other documents and interviews*

The other available documents and the series of interviews with some of the key actors in tropical forest management were treated using a comparative analysis matrix, making it possible to obtain, for each document or each interview, information on the type of issues mentioned and the points of view expressed. No statistical analysis was performed on these corpora.

# 4. Discussion of the french notion "dispositif"

"The terms management 'arrangement' or 'mechanism', or sometimes 'setting', are imperfect translations of the French term '*dispositif* de *gestion,* which designates a heterogeneous assembly of human and material elements put together to meet a specific goal and embedded in practical situations. It is hybrid combination of management tools, actors and ways of coordinating action. It can be seen as a convention that the actors negotiate and adopt in order to construct a particular management model.

Management arrangements are knowledge/power mechanisms in the sense of Foucault's "*apparatus*". They have a *technical* dimension in that they aim to act effectively to influence things or people through processes passed on by tradition that may or may not be related to scientific disciplines (agronomy, forestry, economics, pedology, hydrology, ecology, etc.). They have an *epistemic* aspect because their functioning, based on a certain conception of the elements manipulated, is inseparable from the development of knowledge on these elements. They need a *specific language,* and *systems for categorisation and causal attribution.* They incorporate *morality,* principles and objectives that they are supposed to serve. Finally, they are political constructions because they aim to make people do things and convey scripts and action programmes." (Chiapello & Leroy, 2013).

# 5. List of organisations met

| Categories | Organisation |
|---|---|
| Associations and industrial companies | CDC Climat |
| | Le commerce du bois |
| | Saint-Gobain |
| | $CO_2$ Origination |
| | Rougier |
| | ATIBT – IFIA |
| Donors and ministries | AFD |
| | EC |
| | World Bank |
| | Proparco |
| | Swiss Foundation for Development and International Cooperation |
| | MAP |
| | MAEE |
| Consulting firms | Oréade-Brèche |
| | Société africaine d'expertise |
| | ONFI |
| | FRM |
| | Terea |
| | GRET |
| NGOs | Greenpeace-France |
| | TFT |
| | CI |
| | ANPÉIE |
| | ACAPEE |
| | FNE |
| | WWF-Belgique |
| | WWF-France |
| | FSC-France |

•••

| Categories | Organisation |
|---|---|
| Research bodies | IDDRI |
| | MNHN |
| | CIFOR |
| | I&D |
| | FUSAGx |

# List of acronyms and abbreviations

| | |
|---|---|
| **A/R** | Afforestation / Reforestation |
| **ACAPEE** | *Association centrafricaine des professionnels en évaluation environnementale* (Central African Association for environmental evaluation professionals) |
| **ADB** | Asian Development Bank |
| **ADF** | *Aménagement durable des forêts* |
| **AFD** | *Agence Française de Développement* |
| **AfDB** | African Development Bank |
| **AFLEG** | African Forest Law Enforcement and Governance |
| **AFOLU** | Agriculture, Forestry and Others Land Uses |
| **AFP** | Asia Forest Partnership |
| **ANPÉIE** | *Association nigérienne des professionnels en études d'impact environnemental* (Niger Association for Environmental Impact Study Professionals) |
| **ASEANFLEG** | Association of Southeast Asian Nations Forest Law Enforcement and Governance |
| **ATIBT** | *Association technique internationale des bois tropicaux* (International Technical Tropical Timber Association) |
| **ATO** | African Timber Organisation |
| **CAR** | Climate Action Registry |
| **CBD** | United Nations Convention on Biological Diversity |
| **CBFF** | Congo Basin Foreign Fund |

| | |
|---|---|
| **CBFP** | Congo Basin Forest Partnership |
| **CCBS** | Climate Community and Biodiversity Standards |
| **CCX** | Chicago Climate Exchange |
| **CDC-Climat** | *Caisse des dépôts et consignations – Groupe Climat* |
| **CDM** | Clean Development Mechanism |
| **CF** | Communal forest |
| **CFE** | Community Forest Enterprise |
| **CFM** | Community Forest Management |
| **CFS** | CarbonFix Standard |
| **CI** | Conservation International |
| **CIFOR** | Centre for International Forestry Research |
| **CIRAD** | *Centre de coopération internationale en recherche agronomique pour le développement*<br>(Centre for International Cooperation in Agronomic Research for Development) |
| **CITES** | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| **CITP** | Convention on Indigenous and Tribal Peoples |
| **CLRTAP** | Convention on Long-Range Transboundary Air Pollution |
| **CMS** | Convention on Migratory Species |
| **COFO** | Committee on Forestry of the FAO |
| **COMIFAC** | *Commission des forêts d'Afrique centrale*<br>(Central African Forest Commission) |
| **COP** | Conference of the Parties |
| **CPF** | Collaborative Partnership on Forests |
| **CSD** | United Nations Commission on Sustainable Development |

| | |
|---|---|
| **CSR** | Corporate Social Responsibility |
| **CTFT** | Centre technique forestier tropical (Tropical Forest Technical Centre) |
| **EC** | European Community |
| **ECOSOC** | United Nations Economic and Social Council |
| **EDC** | Eco-Development Committee |
| **EIA** | Environmental impact assessment |
| **EMP** | Environmental management plan |
| **ENAFLEG** | Europe and North Asia Forest Law Enforcement and Governance |
| **ENGREF** | *École nationale du génie rural des eaux et forêts* (National Rural and Forestry Engineering School) |
| **EU** | European Union |
| **FAO** | Food and Agriculture Organization |
| **FDU** | Forest development unit |
| **FFEM** | French Global Environment Facility |
| **FCPF** | Forest Carbon Partnership Facility |
| **FIP** | Forest Investment Program |
| **FLEG** | Forest Law Enforcement and Governance |
| **FLEGT** | Forest Law Enforcement, Governance and Trade |
| **FMP** | Forest Management Plan |
| **FMU** | Forest management unit |
| **FNE** | France Nature Environnement |
| **FRA** | Forest Resources Assessment |
| **FRM** | Forest Ressources Management |
| **FSC** | Forest Stewardship Council |
| **FUSAGx** | Gembloux Agro-Bio Tech, Liège University |

| | |
|---|---|
| **GEEFT** | *Gestion Environnementale des Écosystèmes et Forêts Tropicales* Environmental Management of Ecosystems and Tropical Forests, AgroParisTech |
| **GEF** | Global Environment Facility |
| **GHG** | Greenhouse gases |
| **GIS** | Geographic Information System |
| **GMO** | Genetically modified organism |
| **I&D** | Institutions and development |
| **IADB** | Inter-American Development Bank |
| **IAF** | International Accreditation Forum |
| **IAF** | International Arrangement on Forests |
| **ICRAF** | World Agroforestry Centre |
| **IDDRI** | Research Foundation Institute for Sustainable Development and International Relations |
| **IFF** | Intergovernmental Forum on Forests |
| **IFIA** | Inter-African Forest Industries Association |
| **IFM** | Improve Forest Management |
| **IGF** | Intergovernmental Group on Forests |
| **IGO** | International governmental organisation |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **IPF** | Intergovernmental Panel on Forests |
| **ISO** | International Standardisation Organization |
| **ITTA** | International Tropical Timber Agreement |
| **ITTO** | International Tropical Timber Organization |
| **IUCN** | International Union for Conservation of Nature |
| **IUFRO** | International Union of Forest Research Organizations |

| | |
|---|---|
| **JFM** | Joint forest management |
| **JI** | Joint implementation |
| **LHV** | Legal Harvest Verification |
| **LULUCF** | Land Use, Land-Use Change and Forestry |
| **LVS** | Legality Verification System |
| **MAEE** | Ministry of Foreign and European Affairs (France) |
| **MAP** | Ministry of Agriculture and Fisheries (France) |
| **MCD** | Minimum cutting diameter |
| **MED** | Minimum exploitable diameter |
| **MEA** | Multilateral Environmental Agreement |
| **MEA** | Millennium Ecosystem Assessment |
| **MNHN** | *Muséum national d'histoire naturelle* (French Natural History Museum) |
| **MTCC** | Malaysian Timber Certification Council |
| **NFP** | National Forest Programme |
| **NFAP** | National Forestry Action Plan |
| **NGO** | Non-governmental organisation |
| **NEAP** | National Environmental Action Plan |
| **NEMP** | National Environmental Management Plan |
| **NTFP** | Non-timber forest products |
| **NWFP** | Non-wood forest products |
| **OLB** | *Origine et légalité des bois* (Timber origin and legality) |
| **ONFI** | *Office nationale des forêts – International* (France) (National Forest Agency – International) |
| **OTC** | Over-the-Counter |

| | |
|---|---|
| **ACTO** | Amazon Cooperation Treaty Organization |
| **PC&I** | Principles, criteria and indicators |
| **PEFC** | Programme for the Endorsement of Forest Certification |
| **PROFOR** | Program on Forests |
| **RCW** | Ramsar Convention on Wetlands |
| **RDED** | Rio Declaration on Environment and Development |
| **RECOFTC** | The Center for People and Forests |
| **REDD** | Reducing Emissions from Deforestation and Forest Degradation |
| **RIL** | Reduced-impact logging |
| **SCS** | Scientific Certification System |
| **SD** | Sustainable Development |
| **SEA** | Strategic environmental assessment |
| **SFM** | Sustainable forest management |
| **SFP** | Sustainable forest planning |
| **SMF** | Sustainably managed forests |
| **$tCO_2e$** | Tonne of carbon dioxide equivalent |
| **TFT** | Tropical Forest Trust |
| **TFAP** | Tropcial Forestry Action Plan/Programme |
| **TLTV** | Timber Legality and Traceability |
| **IUCN** | International Union for Conservation of Nature |
| **UN** | United Nations |
| **UNCCD** | United Nations Convention to Combat Desertification |
| **UNCED** | United Nations Conference on Environment and Development |
| **UNCSD** | United Nations Commission for Sustainable Development |
| **UNDP** | United Nations Development Programme |

| | |
|---|---|
| **UNEP** | United Nations Environment Programme |
| **UNEP-WCMC** | United Nations Environment Programme – World Conservation Monitoring Centre |
| **UNESCO** | United Nations Educational, Scientific and Cultural Organization |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **UNFF** | United Nations Forum on Forests |
| **VCPOL** | Vienna Convention for the Protection of the Ozone Layer |
| **VCS AFOLU** | Verified Carbon Standard - Agriculture, Forestry and Other Land Use |
| **VFC** | Village Forest Committees |
| **VLC** | Verification of Legal Compliance |
| **VLO** | Verification of Legal Origin |
| **VPA** | Voluntary Partnership Agreement |
| **WB** | World Bank |
| **WCED** | World Commission on Environment and Development |
| **WHC** | World Heritage Convention |
| **WRI** | World Research Institute |
| **WSSD** | World Summit on Sustainable Development |
| **WTO** | World Trade Organization |
| **WWF** | World Wildlife Fund |

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# Sustainable Management of Tropical Forests

## From a critical analysis of the concept to the environmental evaluation of its management arrangements

Deforestation across the planet is now described as "*alarming*" by the United Nations Food and Agriculture Organisation (FAO), especially in the tropical regions. Yet, there has been a great deal of talk about "sustainable forest management", even since the early 1990s. This commonly accepted term is, however, still surrounded by a persistent vagueness. How did this widespread concept emerge? What exactly is sustainable tropical forest management? How does it take shape on the ground, in the legislation of the tropical countries concerned and in the management arrangements and practices implemented? And how effective is it for the environment?

These are the questions explored by this study, which uses a theoretical approach based on the management sciences, a bibliometric analysis of over 2,500 references and some forty interviews with key actors of "sustainable forest management". It gives the reader new analytical insights into the concept and its environmental dimension by offering a complete panorama of the arrangements that are being promoted in tropical regions under the "sustainable forest management" umbrella. It also offers an analysis of how far this management has, or has not, succeeded in integrating the environmental issues threatening tropical forests.


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